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UNIC®

SURGICAL TECHNIQUE

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Disclaimer

This document is intended to be read only by experienced orthopaedic surgeons and staff familiar with the application of shoulder arthroplasty, and by individuals related to or acknowledged by Evolutis company.
This publication is intended as the recommended procedure for using the Evolutis UNIC Shoulder System. It offers guidance only. Evolutis is the manufacturer of the device. As such and claiming no medical skill, Evolutis does not recommend a specific use of a product or a technique.
Each surgeon should consider the particular needs of the patient and make appropriate adjustments where necessary.
For any additional information related to the products, the indications and contra indications, the warnings and precautions of use, and the adverse effects, please refer to the INSTRUCTION FOR USE leaflet included in the packaging of implants. For further advice please contact your local representative.

Today, total shoulder replacement is an everyday operation when undertaken by trained surgeons. The objectives are to relieve pain due to degenerative lesions or trauma of the gleno-humeral joint, and to restore functional movement of the upper limb.

Which prosthesis for which indication?

Intermediate (hemi) prosthesis where the proximal humerus and head are replaced with a prosthesis without resurfacing the glenoid are limited to pathologies which only affect the humerus (fractures, avascular osteo-necrosis), and where the glenoid is intact (AON stages 2 and 3, post fracture necrosis).

CTA (Cuff Tear Arthroplasty) where the glenoid is not re-surfaced is used in clinical situations where the rotator cuff muscles are irreparable and where the glenoid is severely damaged with loss of bone density or stock which would render it impossible to implant a glenoid prosthesis (glenosphere and baseplate).

Anatomic Total Shoulder Arthroplasty (ATSA) is indicated when both sides of the articulation are affected (primary centred arthritis or secondary stage 4 or 5, inflammatory arthritis...). The rotator cuff must be in good functional condition, without motor deficiencies, which are important for stability of the articulation as well as function. The glenoid bone stock must be sufficient for the fixation of a glenoid implant. Anatomic prostheses are contra indicated where there is permanent joint instability.

Reverse total shoulder arthroplasty (RTSA) is indicated when both sides of the articulation are affected and associated with rotator cuff tear. Functional recovery (flexion, abduction) is only possible due to action of the deltoid. In this indication the glenoid bone stock must also be sufficient for the fixation of a glenoid implant. Reverse prosthesis are contra indicated in cases of deltoid insufficiency.

Previously operated shoulders with articular and rotator cuff damage may also be good indications for Reverse total shoulder.

Finally, proximal humerus fractures in the elderly are also indications for reverse total shoulder.

General contra indications for total shoulder arthroplasty :

- Septic arthritis, strongly contra indicated
- Previous septic episodes must be carefully monitored
- Certain neurological problems may contribute towards joint laxity due to muscular dysfunction

PRE OPERATIVE PLANNING

Essential pre-operative imagery planning elements should be interpreted by using a scanner which is especially of interest in glenoid resurfacing in total arthroplasties.

This helps to assess:

- The condition of the rotator cuff.
- The degree, area and amount of wear of the glenoid.
- The bone quality of the glenoid, volume, shape, and density of the glenoid.

By analysing these elements the surgeon can determine the best theoretical position of the glenoid in 3 planes:

- Antero-posterior position
- High, medium or low position
- Anteversion, neutral, retroversion
- Tilt

These elements will determine the position of the guide wire for glenoid preparation.

The patient should be installed in a half seating position at an angle of about 30°, (beach chair).
The arm to be operated on should initially be placed on the lateral removable support and should be free to move within the operative field in retroplusion and adduction. Ideally the whole of the area of the shoulder and scapula should be unrestricted.

SURGICAL APPROACHES

Total shoulder arthroplasies are generally implanted by either delto pectoral or supero lateral approaches.

The UNIC shoulder prosthesis can be used in different surgical indications of shoulder arthroplasty, principally anatomic and reverse shoulders. It is up to the surgeon to choose the approach best adapted to the indication based on his experience, objectives, the anatomy and condition of the patient.

DELTO PECTORAL

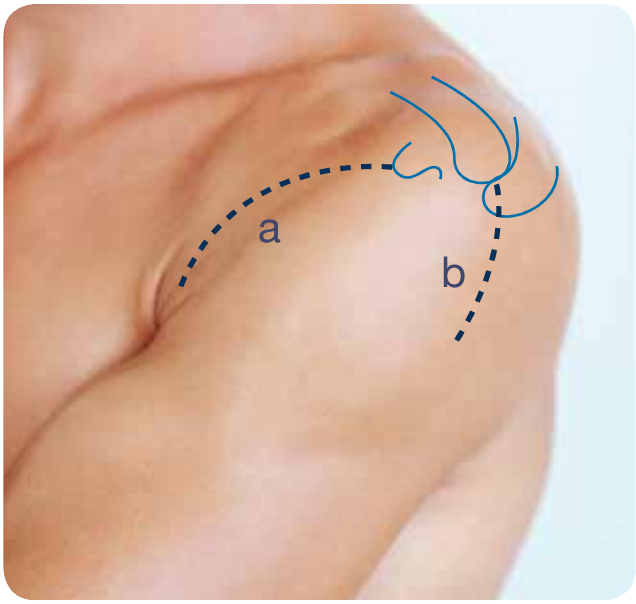
The **delto pectoral** approach which follows the delto pectoral groove is the most widely used because it follows natural landmarks. Humeral exposure is good, preserves the deltoid, is easily reproducible, and is not aggressive for the blood vessels or nerves except for the axillary nerve which must be identified. Furthermore, if access is difficult the incision can be extended quite easily. However the sub scapularis must be cut and the glenoid access is not good.

SUPERO LATERAL

The **supero lateral** approach starts at the anterior edge of the acromion without overstepping the acromio clavicular junction, and descends by about 3 or 4cm. This approach is generally indicated in complex glenoid surgeries where due to excellent visibility glenoid access is important. It can be used where rotator cuff repair is associated with arthroplasties or revisions of prostheses. This approach also gives good access to the axis of the humerus which allows for good control of retroversion and anterior- posterior position. The sub scapularis is untouched, but deltoid must be incised and the rotator cuff reclined if it is intact. Extending the incision in case of necessity can be difficult.

The choice between a delto pectoral or supero lateral approach is usually made by the need or difficulty of access to the glenoid, as well as the condition of the rotator cuff.

The delto pectoral approach is generally preferred for Anatomic TSA, and supero lateral for Reverse TSA.



a : Delto pectoral approach
b : Supero lateral approach

Reaming of the diaphysis

After exposing the head and proximal humerus by external rotation or dislocation (depending on the approach) the entry point of the humerus is identified (generally about 5 to 10mm medial and posterior to the bi-cipiteal groove between the tuberosities ❶. Assemble the T handle on reamer size 0 which is sharp, and perforate the entry point. ❷

T handle	E28 009
Humeral Reamer size 00*	E28 083
Humeral Reamer size 0	E28 084
Humeral Reamer size 1	E28 085
Humeral Reamer size 2	E28 100
Humeral Reamer size 3	E28 115
Humeral Reamer size 4	E28 130

INFOS

Humeral preparation requires the E28 9105 “UNIC Reverse Shoulder instrument set”.

Progressively ream the humerus up to the stop of the reamer starting with size 0 and incrementally increasing size step by step, until cortical contact is achieved. The standard sizes available are 0 to 4.

The last size reamer which reached the stop and had good cortical contact indicates the MAXIMUM size humeral stem to use. Remember the size for the following steps.

Leave the reamer in place and remove the T handle ❸.

NB

Each reamer size corresponds to the length and diameter of the diaphysis of the same size implant. For reamer size “n” the implant used is most often size “n” or sometimes “n-1”

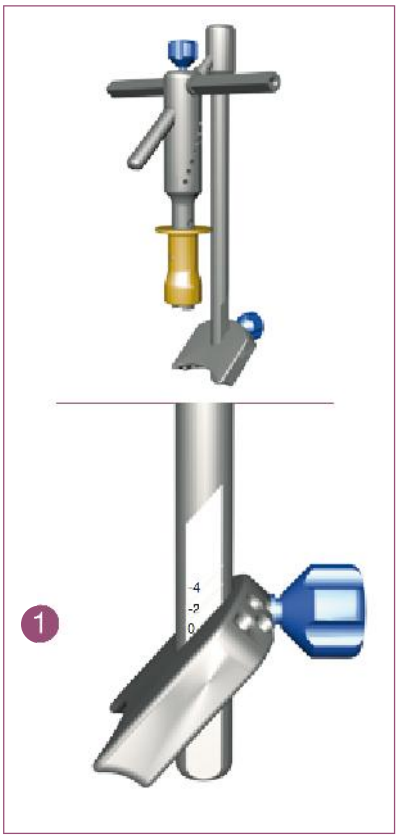
Size of implant	Reamer diameter	Reamer reference
Size 0	Ø7mm	E28 084
Size 1	Ø8.5mm	E28 085
Size 2	Ø10mm	E28 100
Size 3	Ø11.5mm	E28 115
Size 4	Ø13mm	E28 130

* : on special request.

Supero lateral approach

Assemble the supero lateral cutting guide on the supero lateral cutting arm, and adjust to "0" height, and lock with an M6 locknut, which can be tightened with the screwdriver. ❶

Supero lateral cutting guide	E28 017	
Supero lateral cutting guide arm	E28 016	
M6 locknut	S01 024	x2
T handle	E28 009	
Orientation guide	E28 007	
Hexagonal 3,5mm screwdriver	S01 037	
2.5mm, 100mm long pin	E28 102	x2
Humeral cut stylus	E28 156	



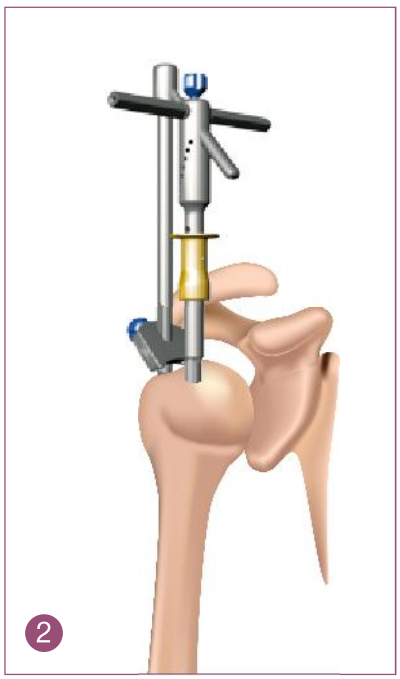
INFOS

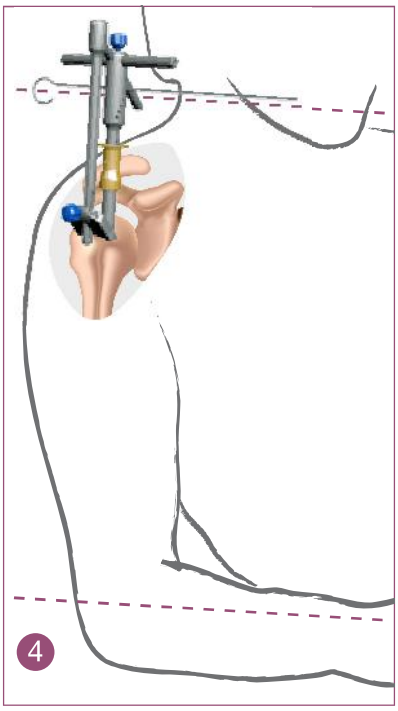
The supero lateral approach requires the E28 9105 "UNIC Reverse Shoulder instrument set".

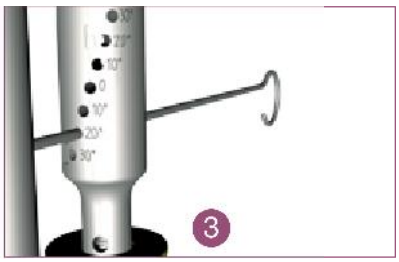
Place the assembled guide through the slanted hole in the T handle, and lock into place with an M6 locknut. ❷

Adjust the cut retroversion to the required amount chosen by the surgeon (0° to 30° posssible in 10° increments).

- Place the orientation guide in the selected index hole in the T handle of the appropriate side. ❸
- Align the orientation guide with the forearm. ❹
- Maintain the assembly in this axis.

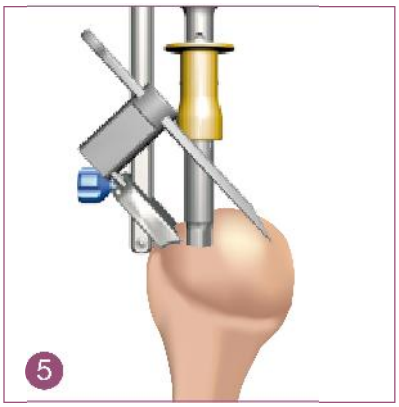






Cut height adjustment :

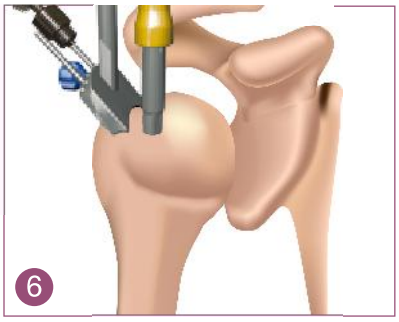
- Slightly loosen the M6 locknut of the cutting guide.
- Introduce the humeral cut stylus into a “0” hole of the cutting guide.
- Place the tip of the stylus in contact with the summit of the humeral head, the cut thickness will be 22mm ❺.
- The thickness of the cut can be increased by moving the cutting guide down over the -3 holes, which will give a cut of 25mm.
- Tighten the cutting guide M6 locknut with the screwdriver.
- Remove the stylus

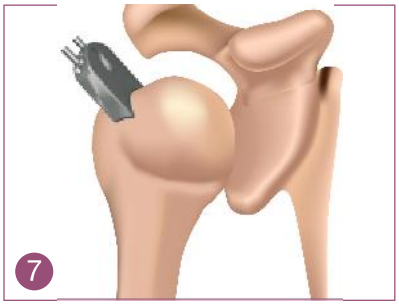


Humeral head cut :

- Place by power tool two 2.5mm threaded pins, length 100mm, through the cutting guide in the “0” position, to fix it onto the humerus ❻.
- Loosen and remove the M6 locknut of the cutting guide and also the support arm.
- Remove the entire reamer, T handle and arm assembly, leaving the cutting guide in place fixed by the 2 pins ❼.
- Cut the head with an oscillating saw ❽ ❾.

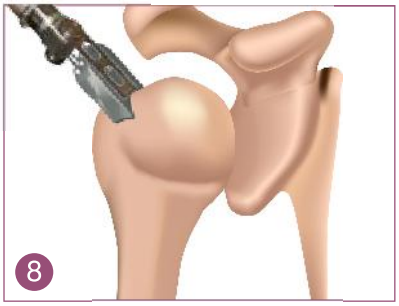
Verify the thickness of the humeral head cut with a micrometer or ruler to confirm the resection height and –for anatomic TSA- to assess the thickness and size of humeral head implant to be used. ❿

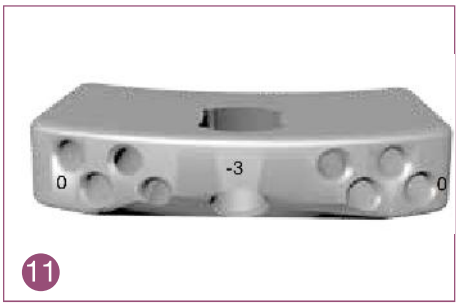


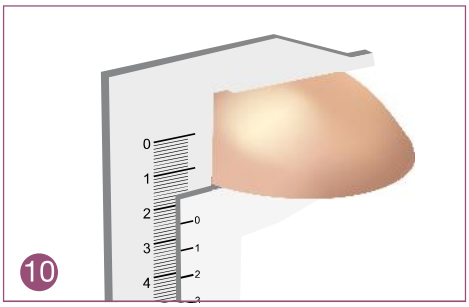


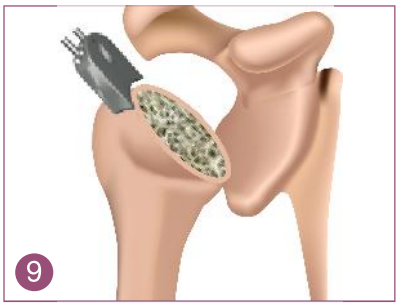
TIP

Validation of the cut height :
- With the arm under slight traction, the medial edge of the cut should be aligned with the inferior edge of the glenoid.
- Should the cut appear too thin, a re-cut of 3mm can be undertaken by repositioning the cutting guide over the pins via the holes marked “-3” ⓫.







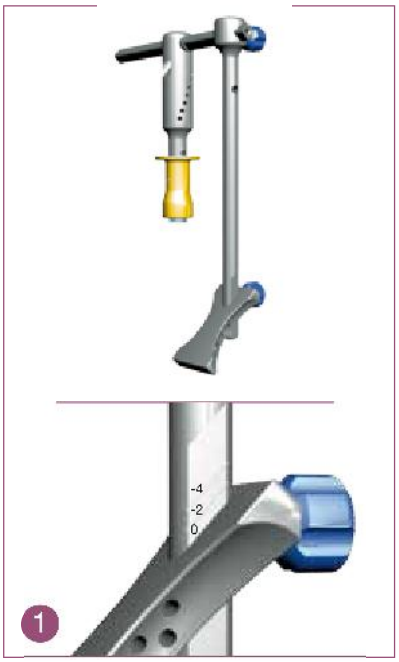


Delto pectoral approach

Assemble the delto pectoral cutting guide on the delto pectoral support arm, and fix it at “0” with an M6 locknut. This can be tightened with the 3,5mm hexagonal screwdriver ❶.

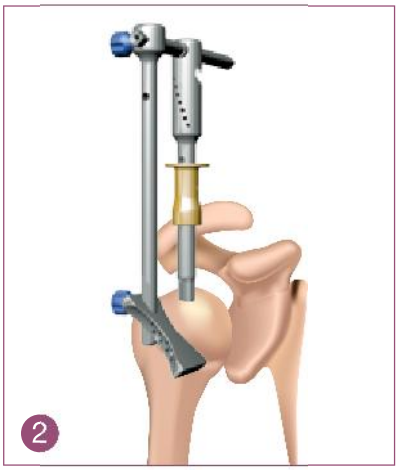
Mount the arm with guide onto the selected side of the T handle, and attach with an M6 locknut.

Delto pectoral cutting guide	E28 010	
Delto pectoral cutting guide arm	E28 089	
M6 locknut	S01 024	x2
T handle	E28 009	
Orientation guide	E28 007	
Hexagonal 3,5mm screwdriver	S01 037	
2,5mm, 100mm long pin	E28 102	x2
Humeral cut stylus	E28 156	



INFOS

The Delto pectoral approach requires the E28 9105 “UNIC Reverse Shoulder instrument set” and the E28 9106 “UNIC Anatomic complementary instrument set”.



Attach the assembly onto the reamer previously left in situ ❷.

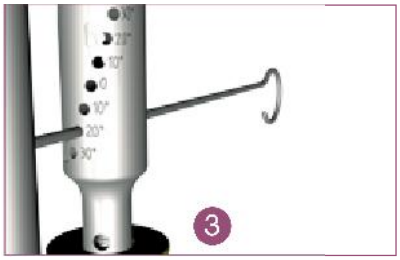
Retroversion adjustments are made in 10° increments as selected by the surgeon (0° to 30° possible):

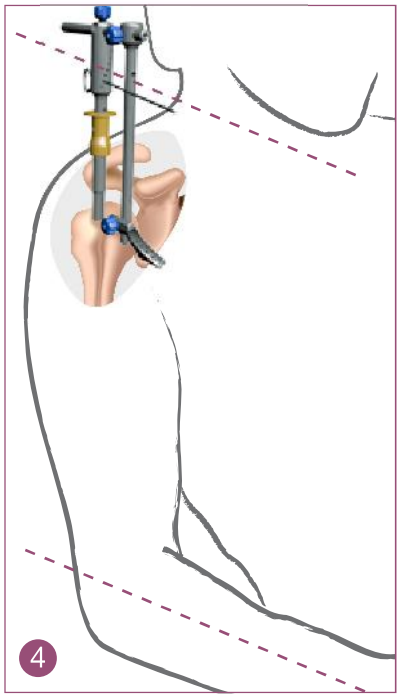
- Introduce the orientation guide through the appropriate eyelet hole in the T handle to give the desired degree of retroversion, on the chosen side ❸.
- Align the orientation guide with the forearm ❹.
- Maintain the instruments in this axis.

TIP

Humeral retroversion should be adapted as a function of the type of implant.

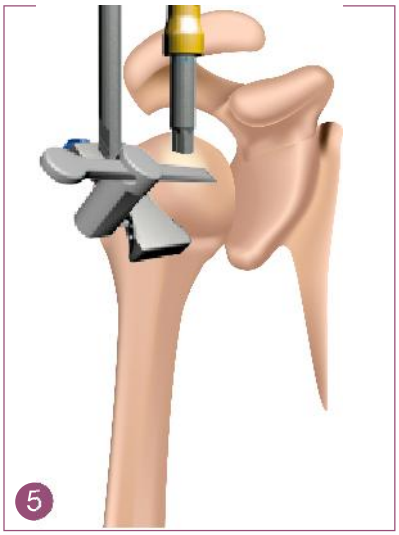
- 10° to 20° for an anatomic prosthesis.
- 0° to 10° for a reverse prosthesis.





Cut height adjustment :

- Slightly loosen the M6 locknut of the cutting guide.
- Introduce the humeral cut stylus into a “0” hole of the cutting guide.
- Place the tip of the stylus in contact with the summit of the humeral head, the cut thickness will be 22mm 5.
- The thickness of the cut can be increased by moving the cutting guide down over the -3 holes, which will give a cut of 25mm.
- Tighten the cutting guide M6 locknut with the screwdriver.
- Remove the stylus.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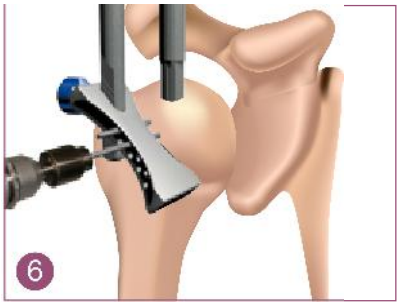
Humeral head cut :

- Loosen the M6 locknut of the arm on the T handle.
- Slide the arm along the horizontal arm of the T handle until the cutting guide is in contact with the humerus.
- Check that the cut is at the desired level.
- Lock the M6 locknut of the arm on the T handle firmly.
- Place by power tool two 2,5mm threaded pins, length 100mm, through the cutting guide in the “0” position, to fix it onto the humerus. 6
- Unscrew the M6 locknut of the cutting guide and the one of the support arm.
- Remove the entire reamer, T handle and arm assembly, leaving the cutting guide in place fixed by the 2 pins. 7
- Cut the head with an oscillating saw. 8 9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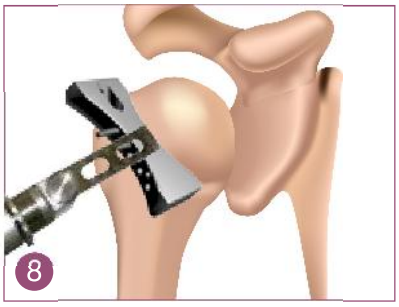
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Verify the thickness of the humeral head cut with a micrometer or ruler to assess the thickness and size of humeral head implant to be used. 10

Should the cut appear too thin, a re-cut of 3mm can be undertaken by repositioning the cutting guide over the pins via the holes marked “-3”. 11

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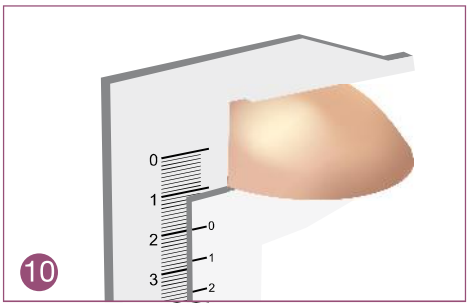

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9

Humeral broach use

Preparation of the humeral canal:

Assemble the size 0 broach on the broach-implant handle as follows:

- Unlock the handle by turning the ring beneath the strike plate ❶.
- Place the handle over the end of the broach.
- Close the handle ❷.
- Lock the system by turning the ring beneath the strike plate until it clicks into place.

Place the broach into the humeral canal ❸.

Place the orientation guide in the selected index hole (0° to 30°) of the appropriate side of the broach and implant handle.

Check that the orientation of the broach is correct by aligning the orientation guide with the forearm, adjust retroversion ❹.

Impact the 0 size rasp up until it is level with the humeral cut.

Broach in one size increments up until the size of the last reamer selected (step 1). It sometimes occurs that the last broach will be one size under the last size reamer.

Check the stability of the broach in rotation and axial subsidence.

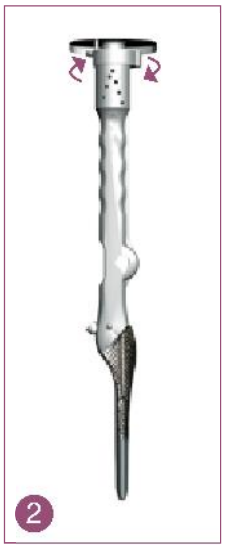
Remove the handle and leave the broach in situ in the humerus. ❺

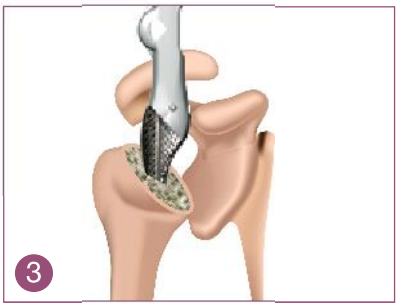
If necessary, re-cut the humerus around the edge of the broach to remove any prominent bone .

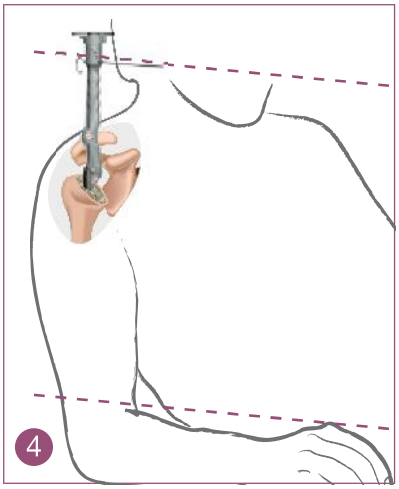
In cases of hard or sclerotic bone, use the wing chisel to prepare grooves for the wings on the prosthesis so as to avoid splitting the humerus ❻.

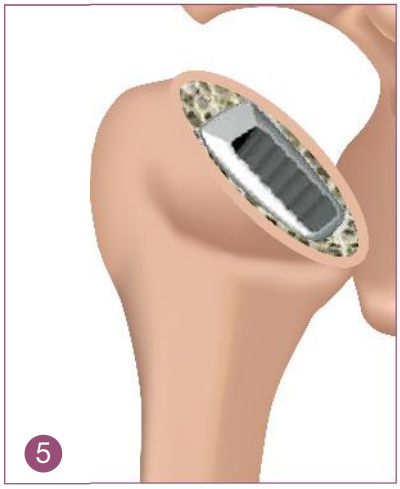
Place the protection plate over the top of the broach (optional) ❼.

Size 0 humeral broach	E28 000
Size 1 humeral broach	E28 001
Size 2 humeral broach	E28 002
Size 3 humeral broach	E28 003
Size 4 humeral broach	E28 004
Broach and implant handle	E28 028
Orientation guide	E28 007
Protection plate	E28 118
Wing Chisel endpiece	E28 127
M6 Impaction shaft	S01 026



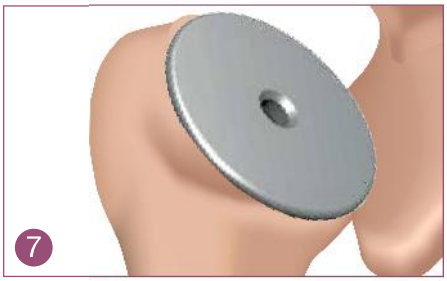


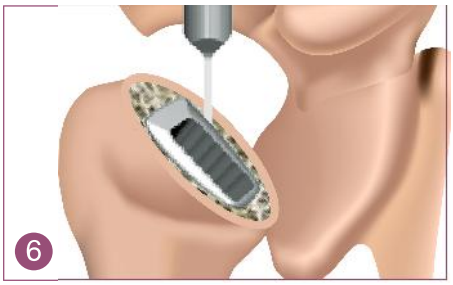




TIP

The broach should either be flush with the cut or just proud of it.
If it is below the level of the cut, the humerus must be re-cut otherwise impaction of the humeral head or base-plate will be compromised.





Glenoid steps

Exposure of the glenoid:

Check that the protection plate has been placed over the proximal humerus.

Retract the proximal humerus by using the Two-pronged retractor which should be placed under the inferior rim of the glenoid 1.

Use of additional anterior and posterior retractor allows for clear exposure of the glenoid.

Remove the joint capsule with a diathermy knife whilst maintaining contact with the glenoid in order to avoid damage to the inferior part of the axillary nerve. Remove osteophytes in order to establish the true edges of the glenoid and its orientation.

Two pronged retractor	E28 110
2.5mm, 150mm long pin	E28 150
Glenoid reamer 30mm	E28 121
Glenoid reamer 33mm	E28 122
Glenoid reamer 36mm	E28 123
Reamer handle	E28 120
"I" shape chisel	E28 009
Starter helical chisel	E28 213
Helical chisel	E28 205

TIP

The Grammont technique was to draw the vertical and horizontal axis with diathermy to show the centre of glenoid, the glenosphere centre should be inferior to the horizontal line and anterior to the vertical. 2

Glenoid preparation:

In order to avoid notching it is best to place the glenoid implant in the inferior part of the glenoid. The inferior edge of the baseplate should be flush with the inferior lip of the glenoid. To do this it is advisable to determine the centre of a 30mm circle which corresponds to the diameter of the glenoid baseplate. This position can be marked with diathermy or k wire.

Place a 2.5mm guide wire 150mm long on a powertool and position it in the centre of the circle, adjust the A/P position in line with the pre-operative images. Drill it into place until the 3cm mark 3.

Assemble the appropriate small glenoid reamer on the reamer shaft and T handle.

Place this over the guide wire left in situ.

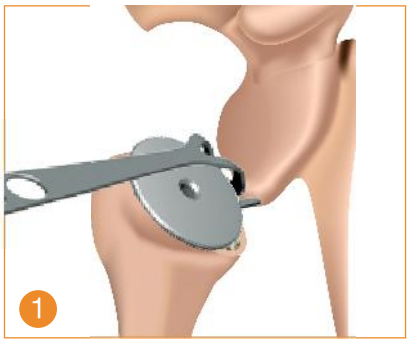
The cutout in the reamer is there to facilitate its introduction into the glenoid space over the retractor and on the guide wire.

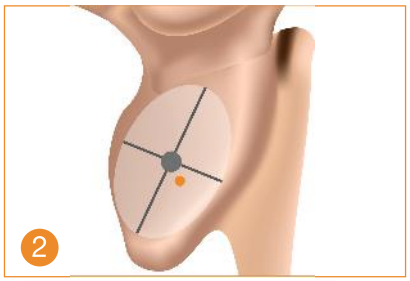
Start reaming by hand in order to remove any prominent hard bone and also avoid fracturing the glenoid if the torque on a powertool is too powerfull 4.

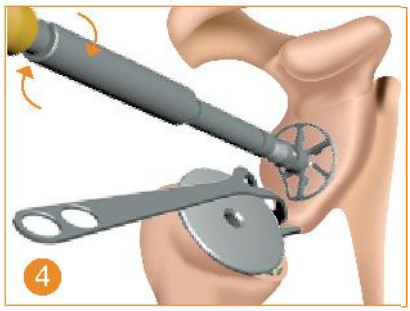
The T handle can be removed and a powertool snapped onto the shaft with a Harris type adaptor 5.

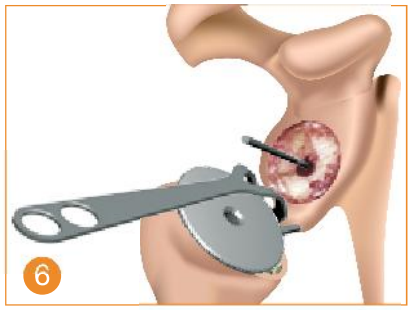
Reaming should be continued until bleeding subchondral bone is reached.

Remove the reamer still leaving the guide wire in place 6.









Preparation of the glenoid base helical blade imprint, 3 steps, 3 chisels :

The "I" shaped first impactor is positioned over the guide wire with a slight anterior tilt towards the coracoid process, 5° off vertical. This will align the future screw holes with the coracoid process base 7.

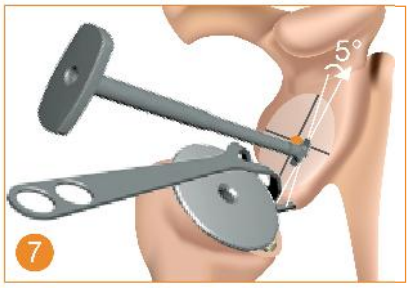
Impact it fully until contact with the glenoid surface.

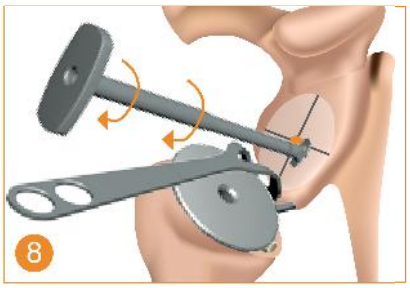
Pull it back slightly, rotate by 180° over the guide wire and repeat 8.

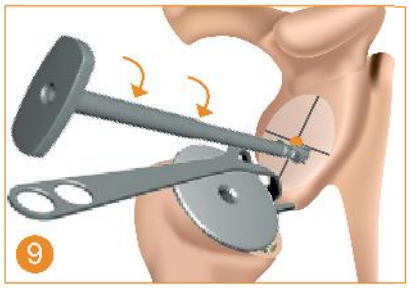
Next, place the starter helical chisel over the guide wire in the same orientation as the previous "I" instrument and impact. The helical shape will turn through 90° on its own 9 10.

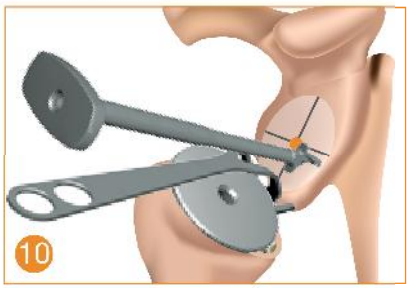
Repeat this step with the larger helical chisel, also allowing it to turn through 90°.

Remove the last chisel and leave the 150mm guide wire in place.



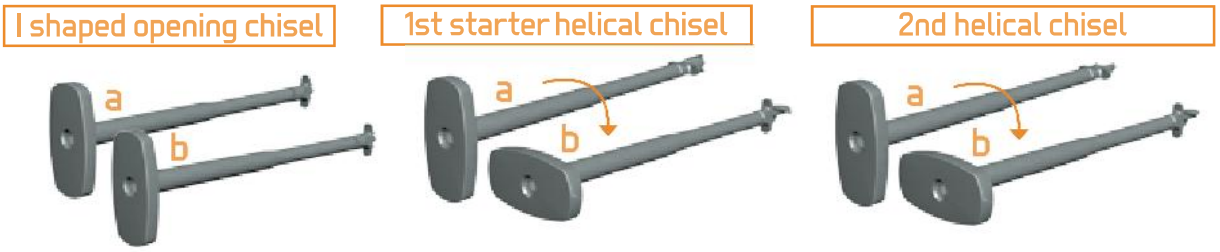






WARNING

At the start of impaction with each helical chisel, all strike plates should be in the vertical axis of the glenoid. After impaction they both turn through 90°, so the strike plate becomes horizontal, but the bar in contact with the glenoid becomes vertical.



a : before impaction
b : after impaction

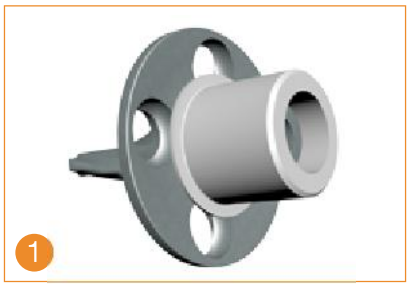
Definitive implants

Helical glenoid base:

Remove the glenoid base from its packaging 1.

Assemble the implant with its polyethylene morse taper protection onto the helical baseplate impactor with the positioner over one of the marked screw holes 2.

Helical baseplate impactor	E28 210
Bell reamer endpiece	E28 124
Reamer shaft	E28 120
Broach and implant handle	E28 028
M6 Impaction shaft	S01 026
Head impaction endpiece	E28 108
T handle	E28 009
3.2mm, 35mm drill	S01 002
Flexible AO attachment	S01 033
3.2mm guide	E28 232
Depth gauge	6006-0071
3,5mm rounded hexagonal screwdriver	S01 037
Blue plastic taper protection	E28 201



WARNING

Leave the polyethylene morse taper protection in place at this stage.

Present the assembled baseplate - helical blade and impactor over the guide wire, using the indicator marks as a positioning aide :

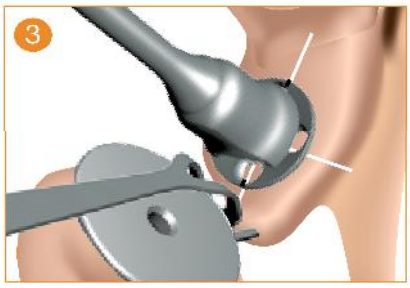
The indicator marks should be vertical 3. Impact the baseplate allowing it to rotate freely.

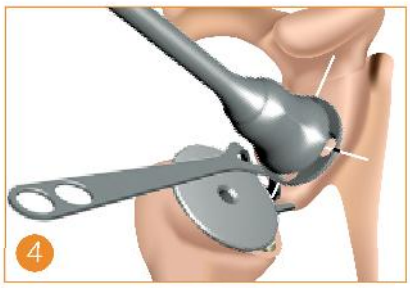
At the end of impaction the indicators should be horizontal. 4

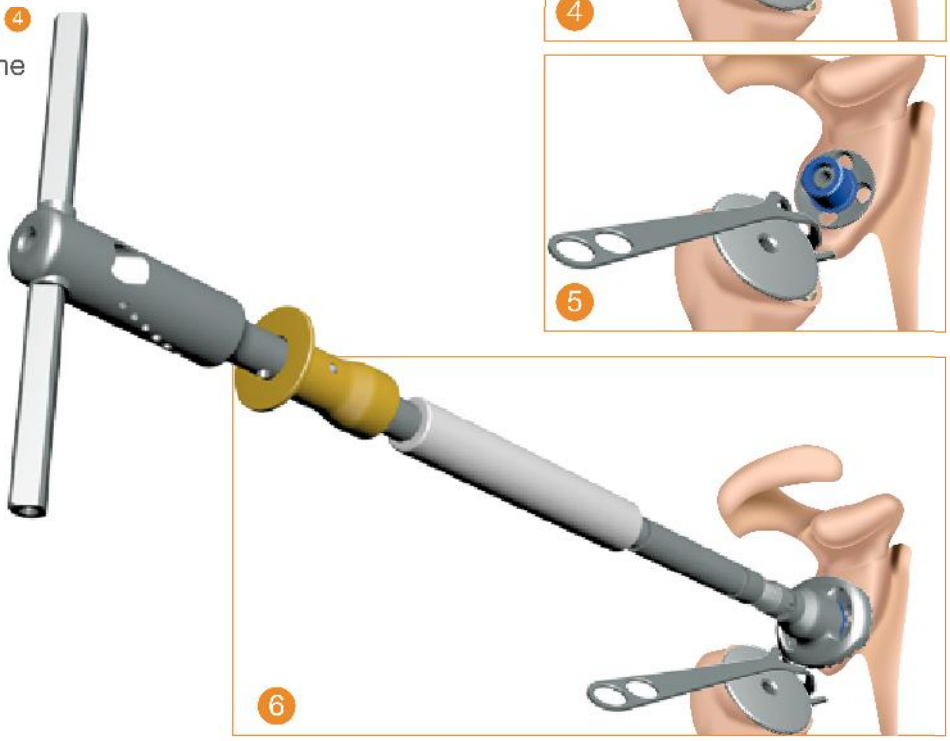
Remove the white morse cone protection sleeve.

Place the bell reamer on the reamer shaft and on the T handle. Put the blue plastic taper protection over the morse taper. 5

Place the assembled bell reamer over the guide wire and ream around the baseplate to remove peripheral bone and ostepyhtes, ream until it turns freely. 6



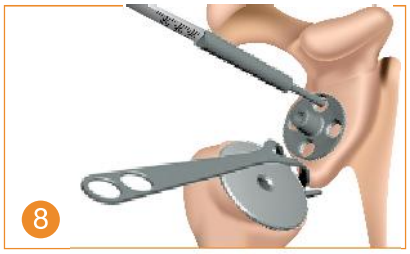


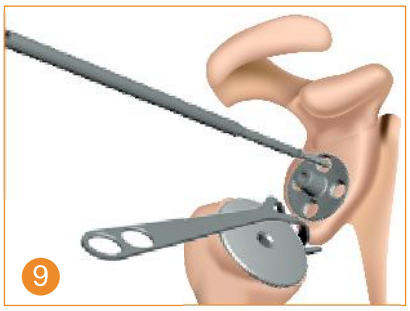


Finish the baseplate fixation by using between 2 and 4 of the cancellous bone screws. A minimum of 2 screws is necessary to ensure rotational stability of the baseplate.

Screw implantation steps :

- Assemble the 3.2mm drill, length 35mm onto the flexible AO attachment and onto the powertool.
- Place the drill into the 3.2mm guide in one of the screw hole positions. 7
- Drill at the orientation and to the depth required.
- Measure using the depth gauge. 8
- Screw the screw(s) into place using the 3,5mm rounded hexagonal screwdriver. 9





WARNING

The glenoid screw orientation must be in line with pre-operative selection. Opposite screws are best placed divergent, yet must not come out of the bone.
The inferior screw is best horizontal to restrict contact in case of notching.
The superior screw can be orientated towards the base of the coracoid process.

Humeral implants :

UNIC implants are available either in versions to be cemented or with a dual coating of porous Ti + HA for cementless fixation.

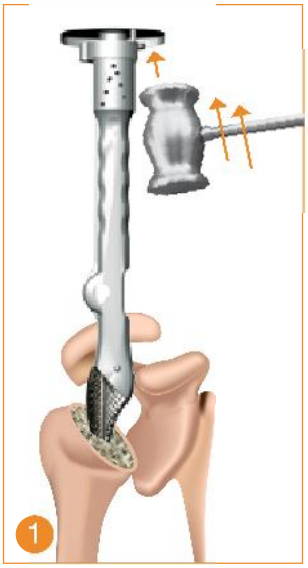
For cementless use, the stem size must be the same as the last size rasp which was seated in the humerus.

For cemented use, cement mantle thickness choice is up to the surgeon. Cement preparation should be in line with best cementation practice.

Remove the humeral broach from the humerus by attaching the broach handle to it and striking upwards on the strike plate with a hammer 1.

Attach the definitive implant onto the same holder as follows:

- Unlock the handle
- Place the implant on the end of the holder
- Close the handle
- Lock by turning the locking ring beneath the strike plate 2.

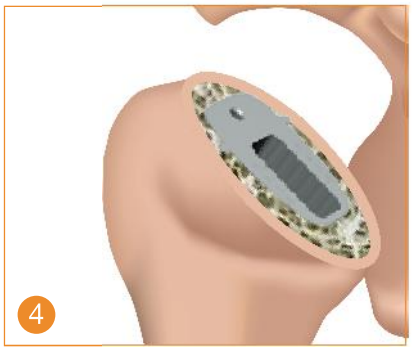


Place the implant inside the humeral canal and impact until it is stable. 3

Retroversion can be checked with the retroversion guide.

The proximal part of the stem should be flush with the humeral cut. 4
If not then:

- If the prosthesis is too suspended, re-impact it. If the bone is sclerotic, it is best to have used the wing chisel (page 12) to avoid fracturing the humerus;
- If the prosthesis is sunk below the level of the cut, re-cut the proximal humerus so that the cut is flush with the stem, it may be necessary to repeat the head size trials with the definitive implant.



Implantation of the glenosphere :

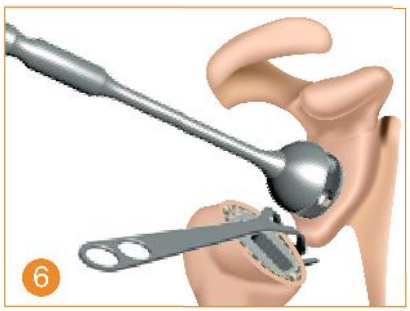
Screw the glenosphere onto the M6 impaction handle 5.

Present the head over the baseplate morse taper in the axis of the cone. 6

Lightly impact the head over the cone.

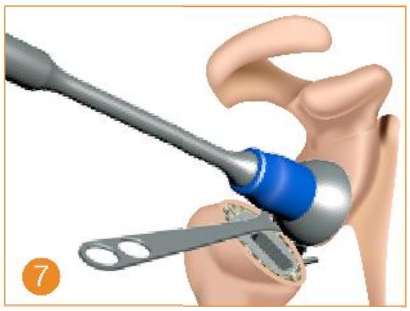
Unscrew the handle making sure the head does not rotate on the cone. Assemble the head impaction endpiece on the M6 handle and finish by impacting the head firmly 7.

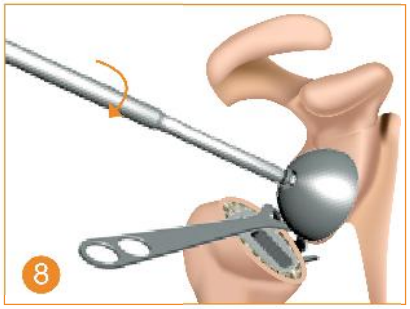
Screw into place the glenosphere security screw 8.



INFOS

In case of selection of a ceramic glenosphere, the following instruments should be requested beforehand, E28 214, E28 215, E28 222 for the protocol outlined on page 20.





Humeral cup trial and assembly

Reduction of the articulation and trials :

Assemble the adjustable humeral cup trial with the adjustable insert in either standard or retentive model.

Adjustable humeral cup trial	E28 250
Adjustable standard insert trial	E28 251
Adjustable retentive insert trial	E28 252
Insert adjuster rod	E28 027
Humeral insert forceps	E28 246
Hexagonal 2.5mm screwdriver	6008-0002
Screw holder	6008-0017
Convex impaction endpiece	E28 112
M6 impaction shaft	S01 026
Impaction ring	E28 221

INFOS

The choice between standard and retentive inserts is made according to the general condition of the patient, joint stability, muscle tone.

Adjust the insert position to “0” in the trial cup.

Place the trial cup plus insert into the highest position inside the humeral stem and ensure that the “UP” position arrow of the cup points up and laterally. 1 2 3

Reduce the articulation using the glenoid impactor mounted on the M6 handle. 4

Through the slit in the humeral cup trial, place the insert adjuster rod into the hole of the adjustable trial insert. 5

Adjust the height of the insert at 0, +2.5mm or +5mm to best fill the joint space. Each step blocks automatically with weight bearing. Check shoulder mobility and verify 6 :

- That there is no impingement with peripheral bone structures
- Articular stability
- Range of motion
- That there is laxity or piston of between 2 and 5mm (shock test)
- When stable record the position and height for the definitive cup.

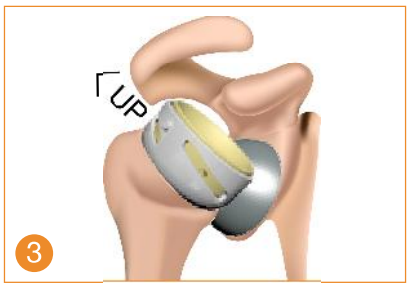
TIP

If the trials are not stable in this position, the UNIC allows for intra articular adjustment of laxity :

- Either by using thicker inserts of +2.5 or +5mm
- In cases of severe laxity by using a +10mm augmentation module.
- Or by repositioning the cup in the more medial positions, which will lateralise the humerus.

1

2



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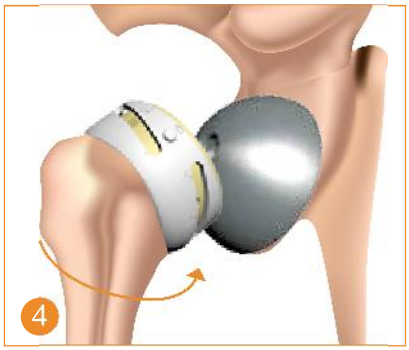
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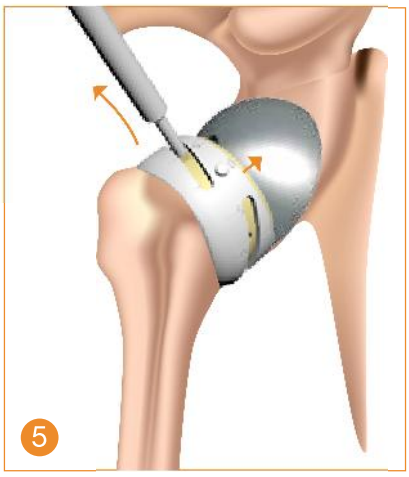
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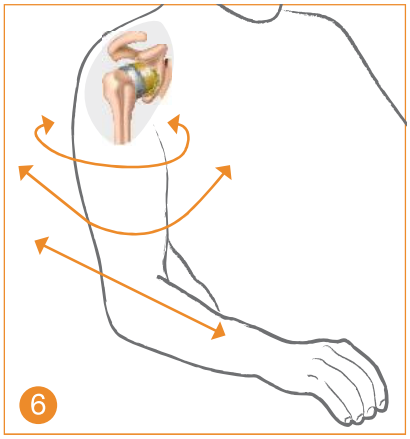

6

Assembly of the humeral cup :

On the instrument table, place the definitive humeral cup on the impaction ring.

Place the selected humeral insert in the humeral cup.

Impact the insert with the convex impaction endpiece on the M6 handle. 6

Place the assembled humeral cup and insert over the previously selected position of the humeral stem. 7

Ensure that the cup - stem connection is clean and free of bone or soft tissue, and impact the cup into the stem making sure the 'UP' cup indicator is orientated towards the lateral and superior part of the humerus. 8

Reduce, test and close.


6


7


8

Option : Additional security screw for the cup – stem junction :

In certain at risk indications (neuromuscular disorders, marked joint laxity) it is possible to augment the fixation of the humeral cup into the humeral stem via a security screw in the topmost (lateral) position.

Place the humeral cup without the insert directly in the humeral stem at the highest position. Impact it using the convex impaction endpiece on the M6 handle. Place the 3.5mm security screw into the screwdriver – holder 9. Make sure the screw head has clipped into the holder.

Screw the screw through the cup hole firmly into place 10.

Place the selected humeral insert in the cup.

Position the fork of the specific humeral insert forceps under the lower edge of the cup with the blue plate over the insert 11.

Squeeze the forceps in order to impact the insert.

Remove the forceps.

Reduce, test and close.


9


11


10

Specific protocol for reverse shoulder ceramic components :

Prepare the glenoid base in the same way as for use with a metal glenosphere.

Assemble the ceramic glenosphere on the specific holder by clipping the holder into the ceramic screw hole. Check that the impactor is in good contact with the glenosphere.

Present the glenosphere over the base morse taper cone in a straight axis.

Impact the ceramic glenosophere 1.

The impactor should unclip from the glenosphere and leave it on the cone.

Assemble the glenoid sphere impactor endpiece on the M6 impaction shaft and finish the glenosphere impaction 2.

Screw into place the security screw with moderate torque. 3

Humeral ceramic insert holder	E28 215
Glenoid ceramic sphere holder	E28 222
M6 impaction shaft	S01 026
3.5mm rounded hexagonal screwdriver	S01 037
Glenoid sphere impactor endpiece	E28 233

Use of the ceramic humeral insert:

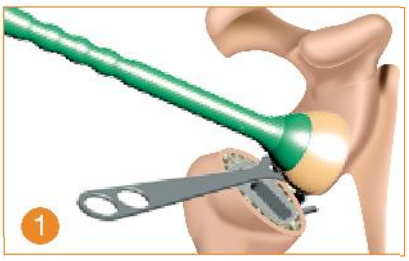
Position the ceramic humeral insert holder on the ceramic insert. Place the suction side in the convexity of the insert, and push it down to create vacuum and hold the insert 4.

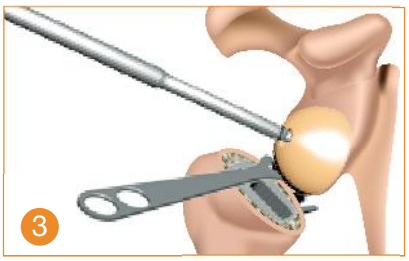
Place the insert in the cup and impact 5.

Test the stability by pulling on the insert holder.

Release the vacuum by pulling on the trigger and remove the holder 6.

Reduce, test and close.





Glenoid steps

Exposing the glenoid :

Place the protection plate over the cut end of the humerus

Retract the proximal humerus by using the 2-pronged retractor which should be placed under the inferior rim of the glenoid ❶.

CAREFUL

Place the retractor prongs under the glenoid rim and slightly posterior.

Remove the joint capsule with a diathermy knife whilst maintaining contact with the glenoid in order to avoid damage to the inferior part of the axillary nerve. Remove osteophytes in order to establish the true edges of the glenoid and its orientation.

If necessary draw the axes of the glenoid with the diathermy ❷.

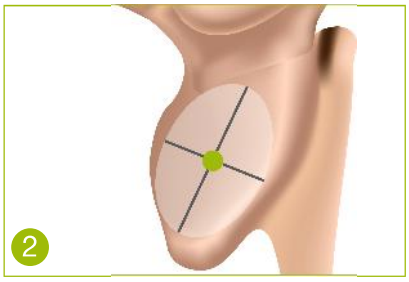
Place the glenoid guide wire guide over the glenoid surface with the 2 large holes vertical ❸.

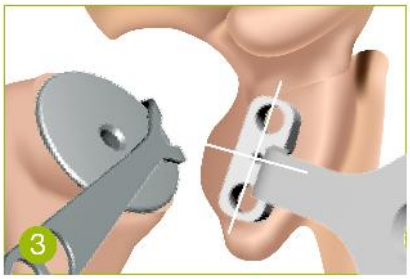
Once the position of the anatomic glenoid is selected, fix the orientation with a 2.5mm guide wire 150mm length, with a powertool through the hole in the centre of the guide. Be careful not to go beyond the 30mm mark ❹.

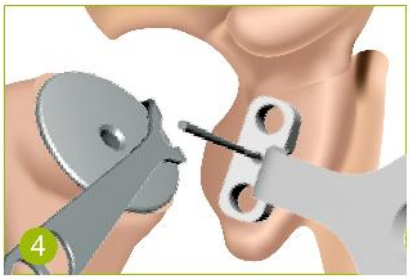
2 pronged retractor	E28 110
Glenoid guide wire guide	E28 228
2.5mm guide wire 150mm length	E28 150
36mm trial glenoid	E28 106
33mm trial glenoid	E28 116
30mm trial glenoid	E28 117
30mm glenoid reamer	E28 121
33mm glenoid reamer	E28 122
36mm glenoid reamer	E28 123
Reamer shaft	E28 120
T handle	E28 009
8.5mm stop drill length 30mm	E28 105
Stabiliser plug	E28 114

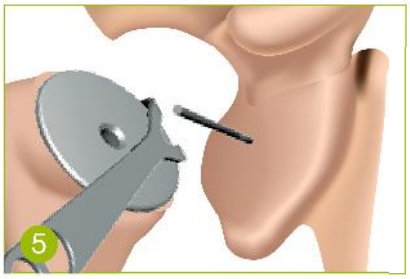
Remove the drill guide and leave the guide wire in place ❺.

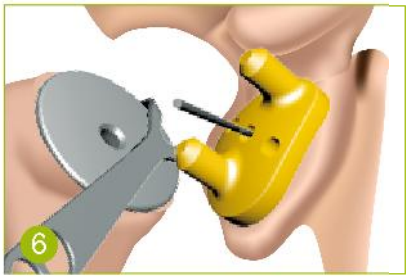
At this stage it is still possible to adjust the size, centring and position of the selected anatomic glenoid implant by placing the trial glenoid over the guide wire with the pegs facing out ❻.







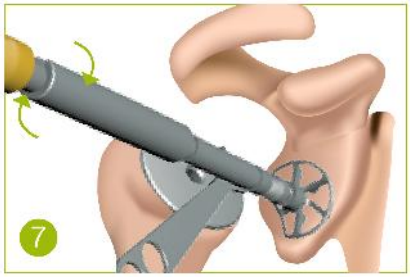




Preparation of the glenoid :

Assemble the glenoid reamer of the selected size, 30, 33 or 36mm on the reamer shaft and T handle.

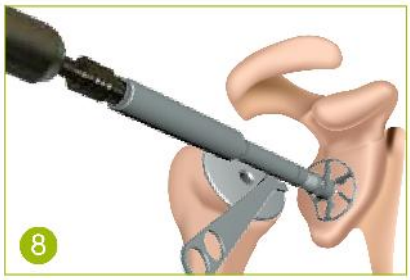
Place this over the guide wire 7.



The cutout in the reamer is there to facilitate its introduction into the glenoid space over retractor and on the guide wire.

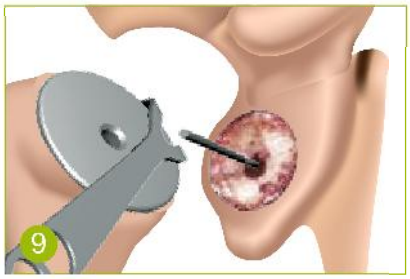
Start reaming by hand in order to remove any prominent hard bone and also avoid fracturing the glenoid if the torque on a powertool is too powerfull.

The T handle can be removed and a powertool snapped onto the shaft with a Hudson type adaptor. 8



Reaming should be continued until bleeding subchondral bone is reached. 9

Remove the reamer still leaving the guide wire in place.



Preparation of the peg holes :

Place the Glenoid guide wire guide over the guide wire 10.

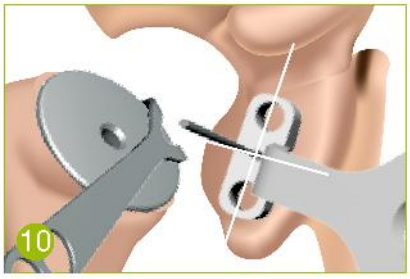
Maintain the guide in position and drill the superior hole with the 8.5mm stop drill length 30mm 11.

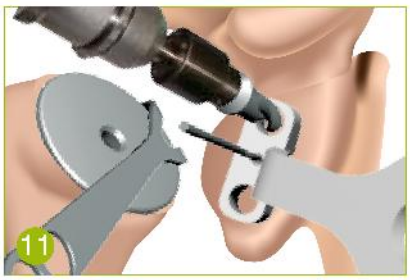
Remove the drill and place the stabiliser plug into the hole 12.

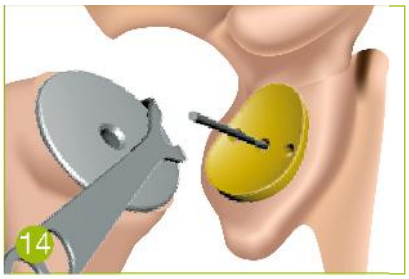
Repeat the drilling process in the inferior hole 13.

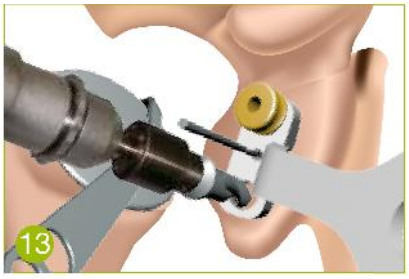
Remove the drill guide and handle.

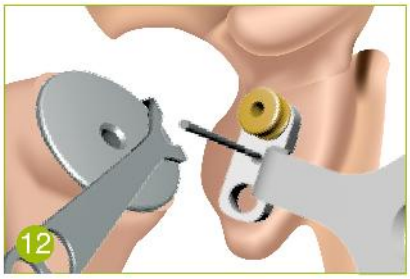
Place an anatomic trial glenoid over the guide wire and check the degree of bone cover and version, select the best size 14.











Trials

Trials, adjustment and choice of anatomic head:

Remove the humeral protection plate (if it was used).

Place a 0° (straight) trial module into the most lateral position of the humeral broach in situ 1.

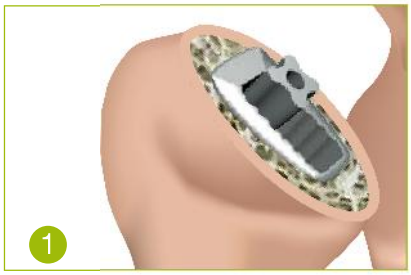
Select the humeral trial head which best corresponds to the previously cut humeral head in diameter and thickness 2.

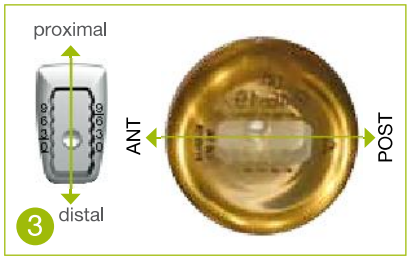
Select the best position in terms of bone coverage by moving the trial head and module in the head into different positions on the broach.

0° (straight) trial module	E28 011
6° (offset) trial module	E28 012
40mm Humeral trial head	E28 140
43mm Humeral trial head	E28 143
46mm Humeral trial head	E28 146
49mm Humeral trial head	E28 149
52mm Humeral trial head	E28 152

Trial humeral modules

6° offset 0°



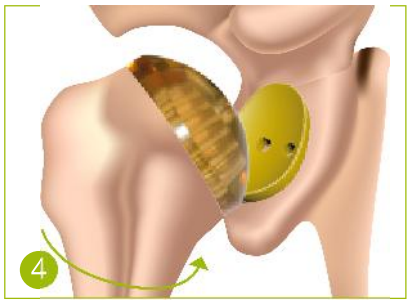


INFOS

The humeral heads are not circular but oval in order to respect anatomy.

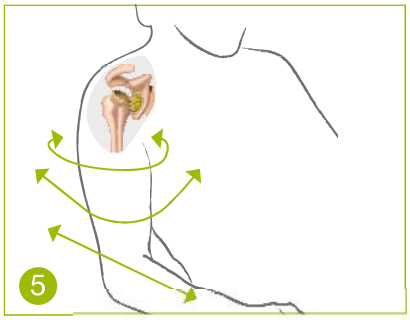
WARNING

Adjustments on the stem are vertical and those on the head are horizontal, which allows the surgeon to select amongst combinations of positions in both planes, proximal/distal and anterior/posterior 3.



In cases where the surgeon must choose between 2 positions, it is best to use the lower of the two in order to avoid possible conflict with the rotator cuff.

The retroversion or varus tilt may be adjusted by +/- 6° by using the offset module.



Trial reductions :

Reduce the articulation with the trial implants in place 4.

Test passive motion, stability and muscle tension.

A slight piston of 2 to 5mm is recommended 5.

TIP

In case of marked laxity, a +10mm augment can be attached to the humeral trial 6.

Definitive implants

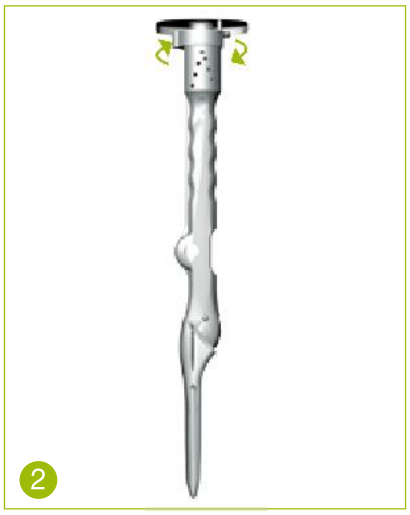
Humeral implants:

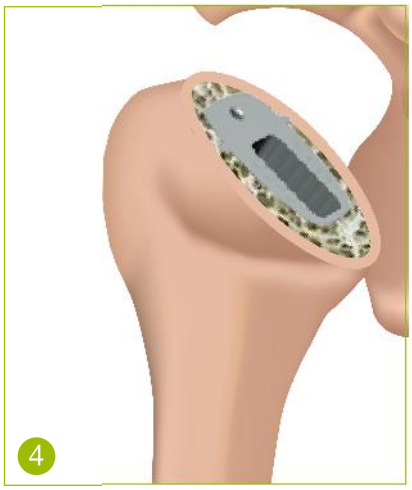
Unic implants are available either in versions to be cemented or with a dual coating of porous Ti + HA for cementless fixation.

For cementless use, the stem size must be the same as the last size rasp which was seated in the humerus.

Broach and implant handle	E28 028
Orientation guide	E28 007
Wing Chisel endpiece	E28 127
M6 Impaction shaft	S01 026

For cemented use, cement mantle thickness choice is up to the surgeon. Cement preparation should be in line with best cementation practice.





Remove the humeral broach from the humerus by attaching the broach handle to it and striking upwards on the strike plate with a hammer 1.

Attach the definitive implant onto the same holder as follows :

- Unlock the handle
- Place the implant on the end of the holder
- Close the handle
- Lock by turning the locking ring beneath the strike plate 2 :

Place the implant inside the humeral canal and impact until it is stable. 3

Retroversion can be checked with the retroversion guide.

The proximal part of the stem should be flush with the humeral cut. 4
If not then :

- If the prosthesis is too suspended, re-impact it. If the bone is sclerotic, it is best to have used the wing chisel (page 12) to avoid fracturing the humerus;
- If the prosthesis is sunk below the level of the cut, re-cut the proximal humerus so that the cut is flush with stem; it may be necessary to repeat the head trials with the definitive humeral implant.

Glenoid implant :

The glenoid implant is only available in an all cemented PE version. Preparation and cementation as per best practices.

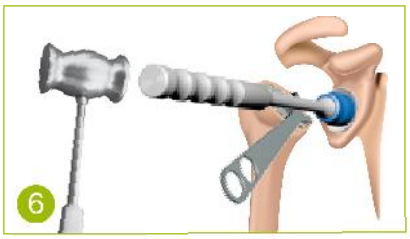
Choose the prosthesis size indicated by the trials. Present the glenoid implant to the glenoid when the cement is in place 5 :

- Place the 2 pegs over the two peg holes, and progressively push them into place using the glenoid impactor endpiece on the M6 impaction shaft 6.

Glenoid impactor endpiece	E28 112
M6 impaction shaft	S01 026
Head impaction endpiece	E28 108

- Remove the excess cement. 7
- Maintain in place under pressure until polymerisation is complete.


5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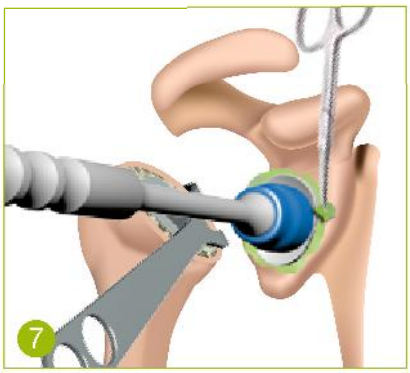
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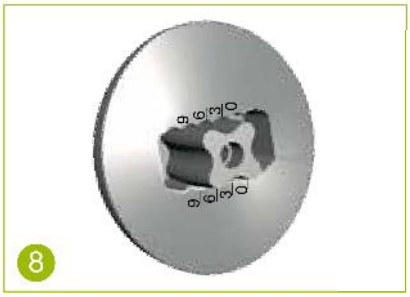
Humeral head positioning :

Assemble the humeral module into the head in the selected position on the operating table. Impact firmly 8.

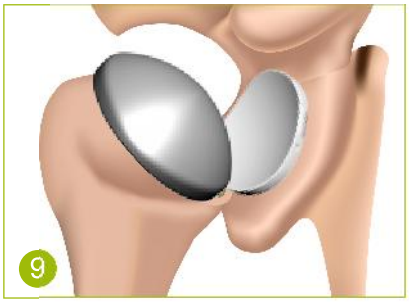
Present the head and module assembly over the selected position in the humeral implant and ensuring that the positions are perpendicular to each other 9.

Impact the head firmly using the head impaction endpiece and the M6 impaction shaft, and check manually for stability 10.


8

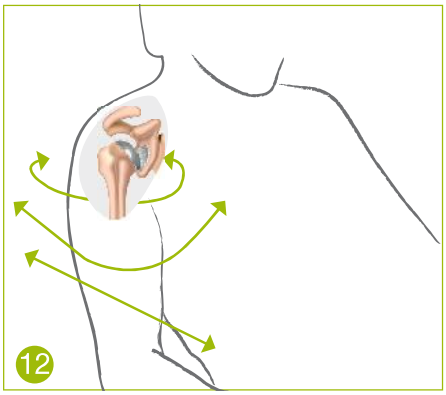
Reducing the articulation :

Reduce the articulation 11 and before closure check mobility and stability 12.


9

INFOS

In passive mobilisation, the posterior subluxation of the head relative to the glenoid should not exceed 50% of the head volume.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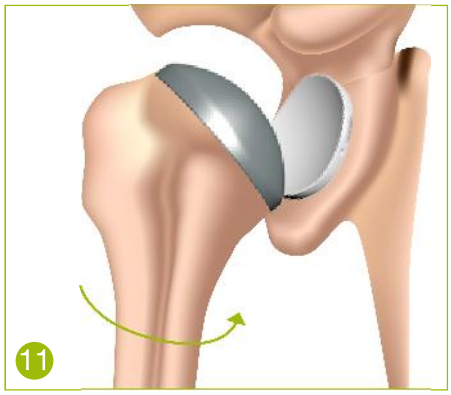
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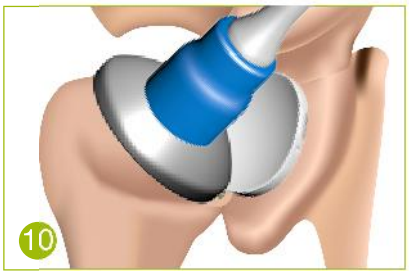

10

Preparation and trials

CTA shoulder hemiarthroplasties are indicated when there is marked deterioration of the rotator cuff muscles associated with poor bone quality of the glenoid which would not allow fixation of a reverse glenoid baseplate. The CTA head in these situations allows for the prosthetic head to articulate in the acromio clavicular arch.

CTA cutting guide	E28 301
42mm CTA trail head	E28 342
46mm CTA trail head	E28 346
50mm CTA trail head	E28 350
54mm CTA trail head	E28 354
head impactor endpiece	E28 108
M6 impaction shaft	S01 026

Preparation and trials :

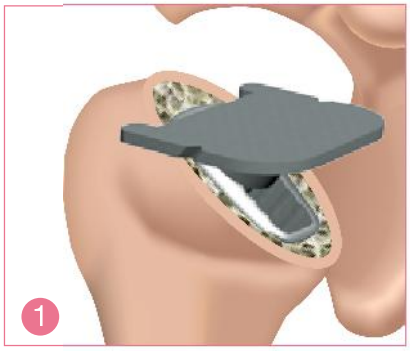
Place the CTA cutting guide on the humeral broach in situ in the highest position 1.

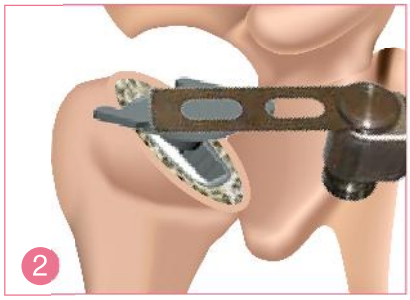
With an oscillating saw placed on the surface of the cutting guide, cut the anterior and posterior supero lateral bone of the humerus 2.

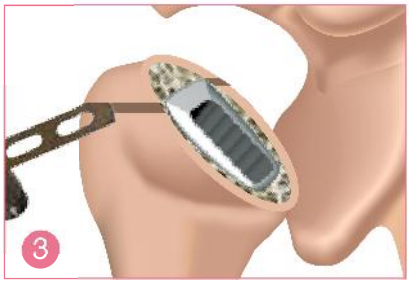
Remove the cutting guide and finish the cut by hand 3.

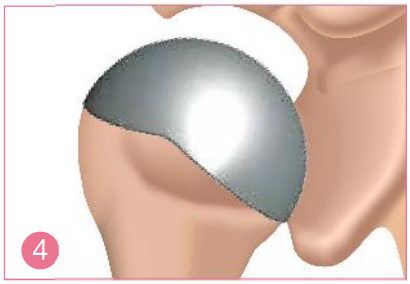
Select the most appropriate CTA trial head which best fits the humeral cut and place it in the highest broach position 4.

Reduce the articulation and test for stability and range of motion 5.







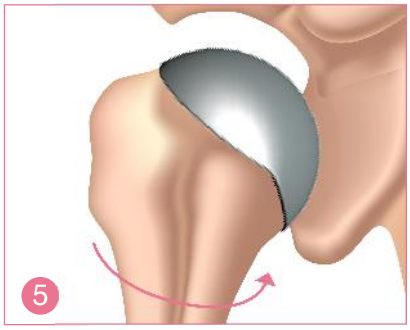


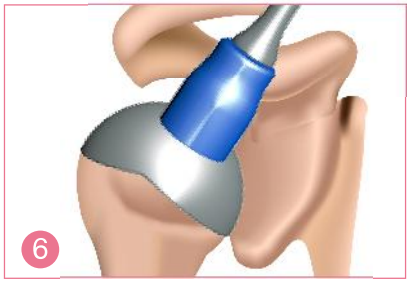
Definitive implants

After the definitive humeral stem has been implanted as outlined in the protocol on page 16, select the CTA head chosen during the trials.

Position the head over the highest recess in the stem and firmly impact using the head impactor on the M6 impaction shaft. 6

Reduce test and close.





Removal of UNIC® components

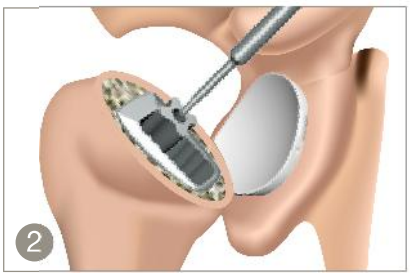
Humeral head removal :

Place the humeral head extractor between the head and stem ❶.

Do not lever.

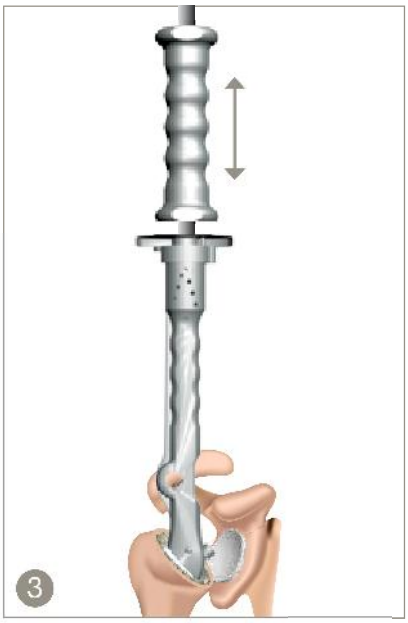
Impact the extractor so that the tip moves into the space between head and stem.

Module extractor	E28 015
Broach and implant holder	E28 028
Slap hammer	H01 015
Humeral head extractor	E28 128
M6 impaction shaft	S01 026
Glenoid sphere extractor	E28 211



Removal of the intermediate modules :

Thread the module extractor through the hole in the module ❷, all the way until it comes into contact with the humeral stem. Continue the screwing motion and the module will be pulled out of the stem.



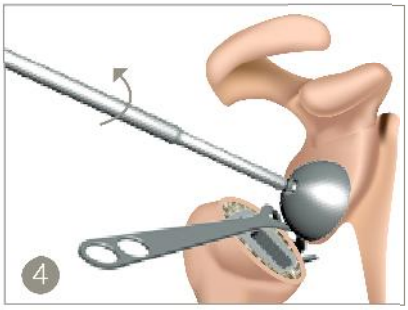
Removal of the humeral stem :

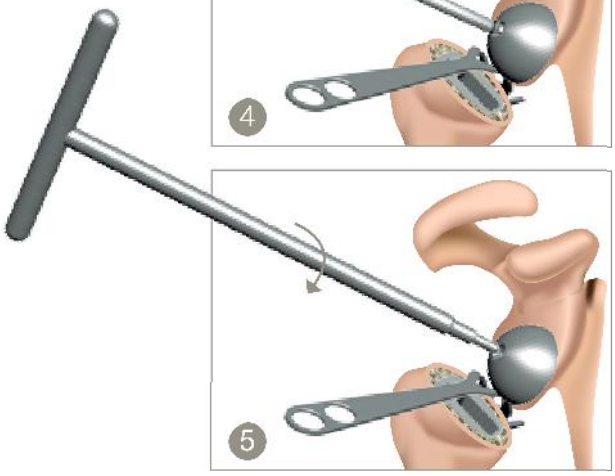
After having removed the intermediate module, place the broach and implant holder in the stem and close it. The slap hammer can be screwed into the stem holder and used to extract the stem ❸.

Removal of the glenosphere :

Unscrew the security screw in the glenosphere ❹.

Screw the glenoid sphere extractor into the glenosphere until it comes out ❺.





WARNING

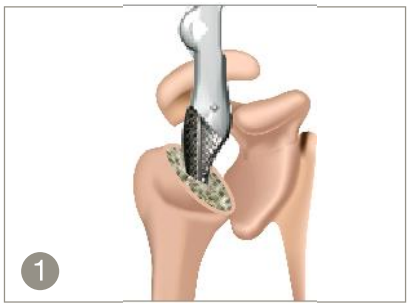
In cases of removal of a ceramic glenosphere use the specific extractor E28 214.

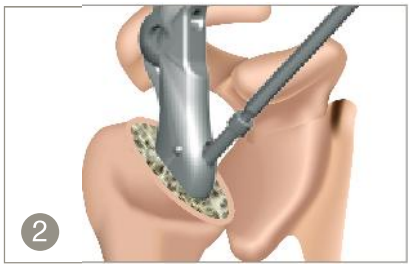
Humeral stem revision

INFOS

Implantation of a revision stem requires use of the Reverse Shoulder set of instruments (E28 9105) plus the revision Shoulder set of instruments (E28 9102).

Size 0 revision broach	E28 R000
Size 1 revision broach	E28 R001
Size 2 revision broach	E28 R002
Size 3 revision broach	E28 R003
Size 4 revision broach	E28 R004
Broach and implant handle	E28 028
Securing fixation screw	E28 019
Distal targeting jig	E28 020
Crossbar	E28 023
M7 yellow locknut	S01 038
M6 T shaped locknut	S01 029
Large sleeve guide	H38 052
4.5mm - 132mm long drill guide	H38 060
4.5mm drill, length 195mm	H38 054
Locking pin depth gauge	H38 055
Screw holder	S01 011





After removal of the implants previously in situ, place the 0 size revision broach on the broach and implant handle. Start broaching and incrementally increase broach size until correct medullary fill, stability and rotation are achieved ❶.

Implant the definitive stem chosen using the broach and implant handle.

Distal locking of the locked revision stem :

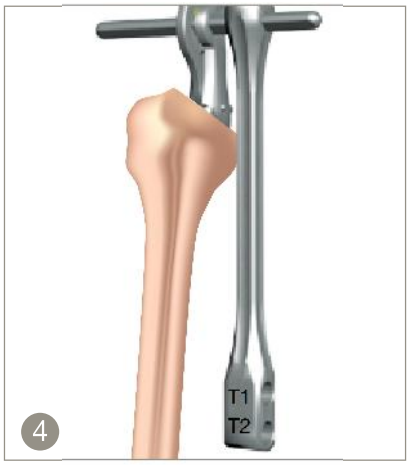
Leave the stem holder on the stem. Stability can be augmented by using the fixation screw securing the handle and stem together. ❷ Attach the distal targeting jig on the crossbar.

Check orientation as follows ❸ :

- The distal jig is reversible.
- One way for stem sizes 1 and 2.
- The other way around for sizes 3 and 4.
- The size required should face laterally ❹.

WARNING

Size 0 cannot be distally fixed as the diameter is too narrow.



Slide the crossbar with jig into the handle as close to the humerus as possible.

Lock it with the yellow M7 locknut. ❺

Lock the distal jig onto the crossbar with the T shaped M6 locknut. Introduce the large sleeve guide into the most proximal hole of the distal jig and push it until it comes into contact with the humeral cortex ❻.

Slide the 4.5mm - 132mm long drill guide into the large sleeve guide. ❼ Mount the 4.5mm drill, length 195mm onto a powertool and drill through both first and second cortex ❽. The graduations on the drill allow for instant reading of drill depth.

Remove the drill and drill guide.

Check the length of the locking pin with the depth gauge ❾.

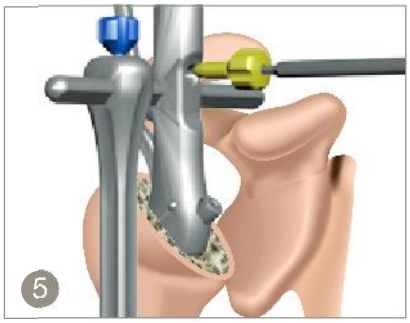
Select the appropriate length of locking pin.

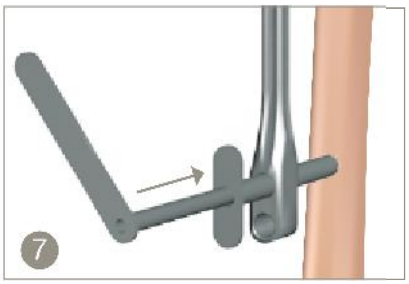
Put the screw holder onto the 3.5mm screwdriver.

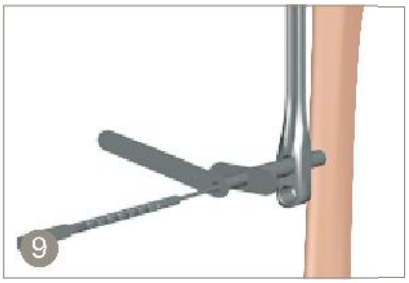
Place the hexagonal part of the screwdriver into the locking pin head, and screw the screw holder over the thread on the locking pin head. The locking pin is now held firmly by the screwdriver and holder.

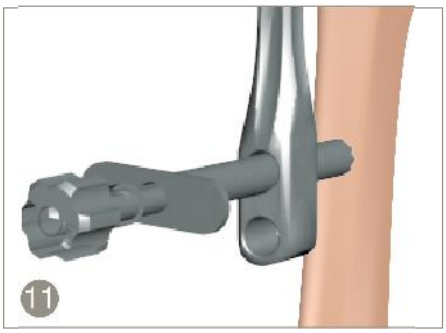
Slide both into the large sleeve guide previously left in place ❿.

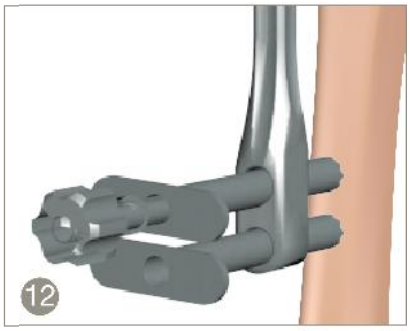
Screw the locking pin into the humerus but not tight, and then withdraw the screwdriver leaving the locking pin and holder in place. This gives more stability whilst preparing the most distal pin ⓫.



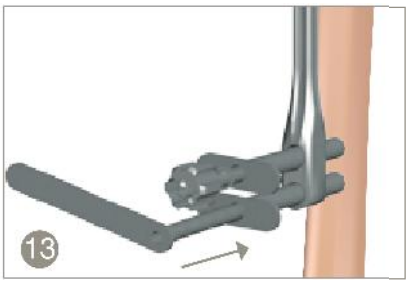








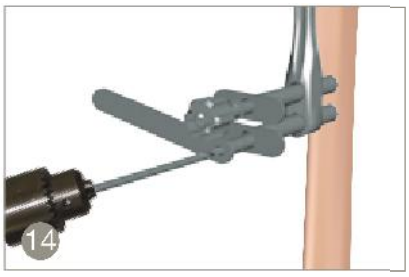
Introduce the 2nd large sleeved guide into the most distal hole of the distal jig and push it until it comes into contact with the humeral cortex ⓬.



Slide the 4.5mm - 132mm long drill guide into the large sleeve guide ⓭. Mount the 4.5mm drill, length 195mm onto a powertool and drill through both first and second cortex. The graduations on the drill allow for instant reading of drill depth ⓮.

Remove the drill and drill guide.

Check the length of the locking pin with the depth gauge ⓯.



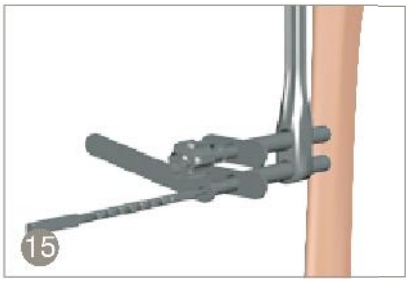
Select the appropriate length locking pin. Mount it onto the screwdriver and holder and screw it into place until firm cortical contact ⓰.

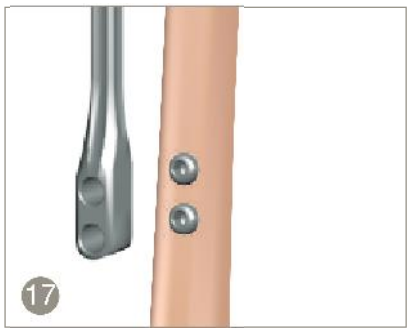
Remove the screwdriver and large sleeve guide.

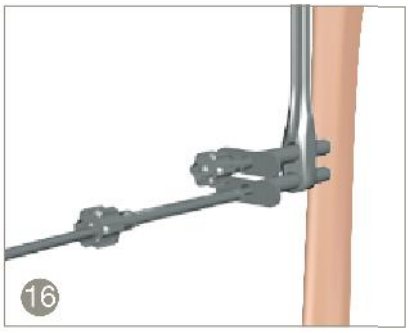
Remove the locking pin holder from the proximal large sleeve guide, taking care to unscrew it from the locking pin head.

Finish tightening the proximal locking pin up to firm cortical contact.

Remove the holder, large sleeve guide and the jig ⓱.





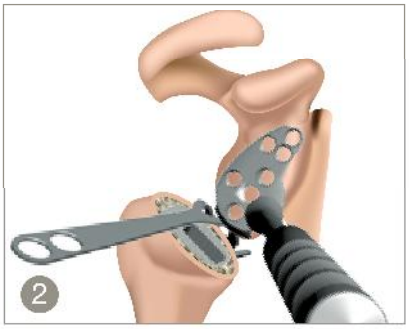


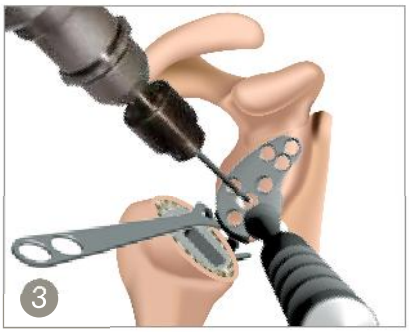
Glenoid revision

INFOS

Implantation of a revision glenoid requires use of the Reverse Shoulder set of instruments (E28 9105) plus the Glenoid revision set of instruments (E28 9103).

Glenoid guide pin sleeve	E28 236
Revision glenoid trial right	S01 026
Revision glenoid trial left	E28 238
M6 impaction shaft	E28 239
2.5mm pin length 150mm	E28 150
30mm glenoid reamer	E28 121
Conical drill for revision peg	E28 120
Back and forth reamer	E 28 009
Reamer shaft	E28 234
T handle	E28 235
20mm trial revision peg	E28 242
25mm trial revision peg	E28 243
Helical baseplate impactor	E28 210
Head impaction endpiece	E28 108
3.2mm, 35mm drill	S01 002
Flexible AO attachment	S01 033
3.2mm guide	E28 232
Depth gauge	6006-0071





Assemble the glenoid guide pin sleeve on the Revision glenoid trial of the appropriate side and onto the M6 impaction shaft ❶.

Position the guide over the patients' glenoid ❷.

Mount a 2.5mm pin length 150mm onto a powertool and drill it through the guide pin sleeve into the bone ❸.

Remove the assembly leaving the guide pin in place ❹.

If necessary the concavity of the glenoid can be reamed using the 30mm reamer.

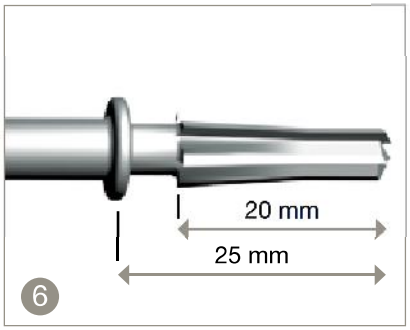
Mount the conical drill for revision peg onto a powertool.

Place the conical drill over the guide pin and drill the glenoid ❺.

The drill can be either drilled to a depth of 20mm or 25mm: ❻

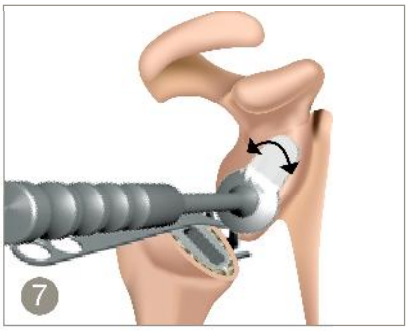
- 20mm stopping at the end of the flutes.
- 25mm stopping at the stop.

Remove the conical drill and guide wire.



Introduce the back and forth reamer into the conically drilled hole, and ream the glenoid surface with alternative clockwise anticlockwise movements ❼.

Assemble the trial revision peg of the length previously determined onto the trial glenoid of the selected side ❽.



Test for bone cover and stability ❾.

Remove the definitive implant from its packaging.

Maintain the morse taper protection in place.

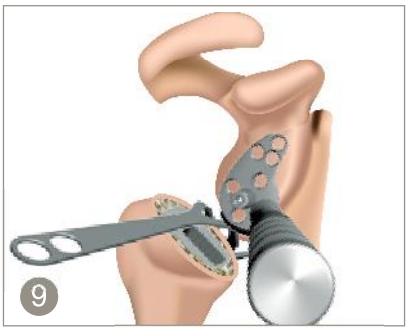
Assemble the implant onto the baseplate impactor.

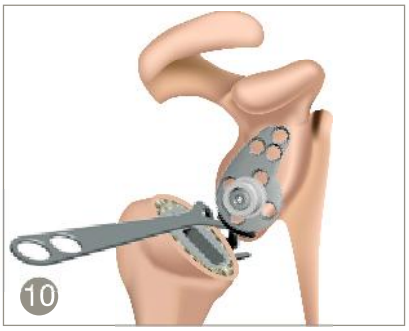
The plate may be shortened by cutting between holes if necessary to adapt to morphology ❿.

Bone graft can be used behind the baseplate or between the peg and inferior lip, dependent on the condition of the bone.

4mm screws are used to fix the superior plate holes and four 5mm screws for the base plate as in primary reverse;

Implant the glenosphere as for the reverse primary shoulder (page 17).

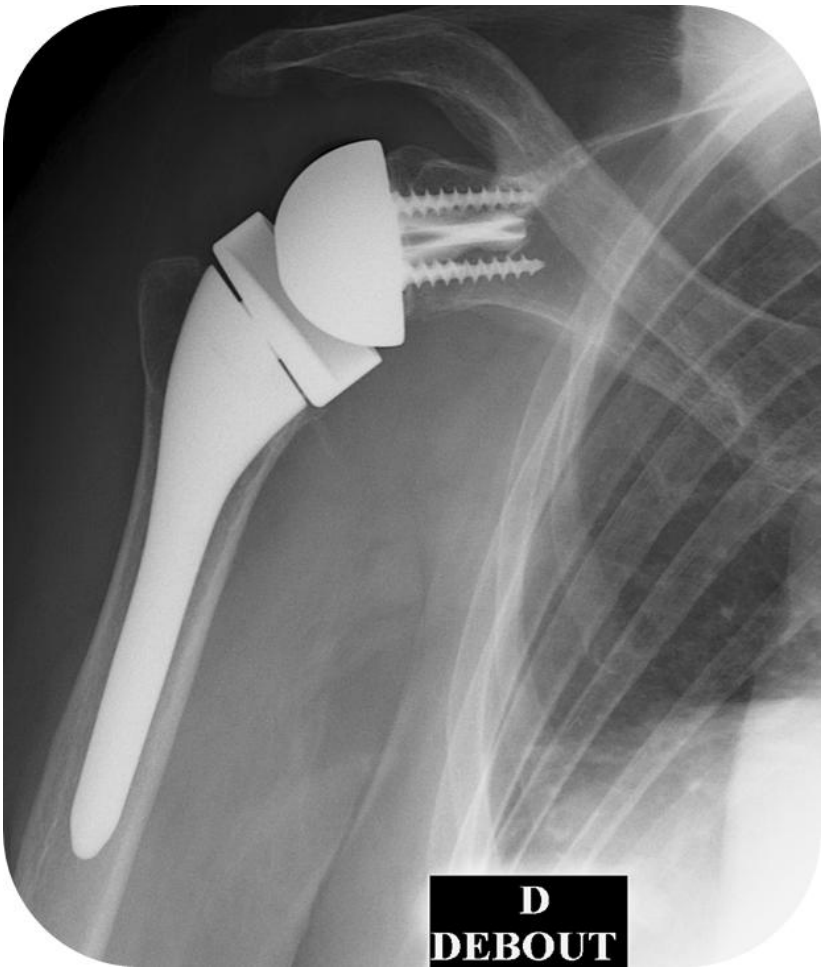




Re-education protocol varies from one surgeon to another.

We advise immobilisation with a scarf with lateral elevation reduction for the first 30days postoperatively. With this immobilisation secondary bone ingrowth into the implants can commence and allows for compression rather than shear forces.

After one month immobilisation, active immobilisation is limited by the patients' pain.



Humeral stem			
Size	Cemented	Length (mm)	Dual coating
T.00	E27 020XS*	110	E27 000XS*
T.0	E27 020	115	E27 000
T.1	E27 021	120	E27 001
T.2	E27 022	125	E27 002
T.3	E27 023	130	E27 003
T.4	E27 024	135	E27 004

Anatomic shoulder	
Humeral module	
Description	Cat. N°
0°	E27 100
6° offset	E27 106

Humeral augment with screw	
	Cat. N°
	E27 110

Anatomic glenoid cemented	
Ø (mm)	Cat. N°
30/22	E27 130
33/24	E27 133
36/26	E27 136

Humeral head		
Ø (mm)	Thickness (mm)	Cat. N°
40	13	E27 140
43	16	E27 143
46	19	E27 146
49	21	E27 149
52	23	E27 152

CTA		
Cuff Tear Arthroplasty Humeral Head		
Ø (mm)	Thickness (mm)	Cat. N°
42	17	E27 342
46	21	E27 346
50	23	E27 350
54	25	E27 354

Humeral Revision stem			
Size	Length	Cemented	Dual coating
00	179	E27 R020XS*	E27 R000XS*
0	180	E27 R020	E27 R000
1	200	E27 R021	E27 R101
2	200	E27 R022	E27 R102
3	200	E27 R023	E27 R103
4	200	E27 R024	E27 R104

Locking pin		
Description	Length	Cat. N°
Ø6.0/Ø4.5	20	H15 SC6020
	25	H15 SC6025
	30	H15 SC6030
	35	H15 SC6035
	40	H15 SC6040

Glenoid Revision Base		
Side	Length	Cat. N°
Right	20	E27 200RD1
Right	25	E27 200RD2
Right	30	E27 200RD3*
Left	20	E27 200RG1
Left	25	E27 200RG2
Left	30	E27 200RG3*

Reverse shoulder	
Helical glenoid base	
Ø (mm)	Cat. N°
26	E27 200XS*
30	E27 200

Glenoid sphere		
Description	Ø (mm)	Cat. N°
Size 00	34	E27 201XS*
Standard size	38	E27 201
Ceramic sphere	38	E27 202

Security screw	
	Cat. N°
For sphere	E27 203
For cup	E27 219

Humeral cup	
Ø (mm)	Cat. N°
32	E27 220XS*
37	E27 220

Humeral insert		
Description	Dimensions	Cat. N°
Standard	0/Ø32	E27 221XS*
Standard	2.5/Ø32	E27 221MXS*
Standard	5/Ø32	E27 221HXS*
Standard	0/Ø37	E27 221
Standard	2.5/Ø37	E27 221M
Standard	5/Ø37	E27 221H
Retentive	0/Ø37	E27 221R
Retentive	2.5/Ø37	E27 221MR
Retentive	5/Ø37	E27 221HR
Ceramic	0/Ø37	E27 222
Ceramic	5/Ø37	E27 222H

Cancellous screws		
Description	Length	Cat. N°
For Ø26 and revision glenoid base	15	E27 415RS*
	17.5	E27 417RS*
	20	E27 420RS*
	22.5	E27 422RS*
	25	E27 425RS*
For Ø30 glenoid base	15	E27 515
	20	E27 520
	25	E27 525
	30	E27 530
	35	E27 535
	40	E27 540
	45	E27 545

* : on special request

Anatomic and CTA complementary instrument set	E28 9106	Q
Delto pectoral cutting guide	E28 010	1
Module extractor	E28 015	1
Delto pectoral cutting guide arm	E28 089	1
8.5mm stop drill length 30mm	E28 105	1
36mm trial glenoid	E28 106	1
33mm trial glenoid	E28 116	1
30mm trial glenoid	E28 117	1
Glenoid reamer 33mm	E28 122	1
Glenoid reamer 36mm	E28 123	1
40mm Humeral trial head	E28 140	1
43mm Humeral trial head	E28 143	1
46mm Humeral trial head	E28 146	1
49mm Humeral trial head	E28 149	1
52mm Humeral trial head	E28 152	1
Glenoid sphere extractor	E28 211	1
Glenoid base extractor	E28 212	1
CTA cutting guide	E28 301	1
42mm CTA trail head	E28 342	1
46mm CTA trail head	E28 346	1
50mm CTA trail head	E28 350	1
54mm CTA trail head	E28 354	1
Tray with lid	E28 9006	1
M8 rod for slap hammer	H01 010	1
Slap hammer	H01 015	1

Reverse TSA instrument set	E28 9105	Q
Depth gauge 6006-0071	6006-0071	1
Hexagonal 2.5mm screwdriver	6008-0002	1
Screw holder 6008-0017	6008-0017	1
Size 0 humeral broach	E28 000	1
Size 1 humeral broach	E28 001	1
Size 2 humeral broach	E28 002	1
Size 3 humeral broach	E28 003	1
Size 4 humeral broach	E28 004	1
Orientation guide	E28 007	1
T handle	E28 009	1
0° (straight) trial module	E28 011	1
6° (offset) trial module	E28 012	1
Supero lateral cutting guide arm	E28 016	1
Supero lateral cutting guide	E28 017	1
Securing fixation screw	E28 019	1
Vis pour réhausseur d'essai	E28 022	1
Insert adjuster rod	E28 027	1
Broach and implant handle	E28 028	1
Humeral Reamer size 0	E28 084	1
Humeral Reamer size 1	E28 085	1
Humeral Reamer size 2	E28 100	1
2.5mm, 100mm long pin	E28 102	2
head impactor endpiece	E28 108	1
Two prongs retractor	E28 110	1
Convex impaction endpiece	E28 112	1
Stabiliser plug	E28 114	1
Humeral Reamer size 3	E28 115	1
Protection plate	E28 118	1
Reamer handle	E28 120	1
Glenoid reamer 30mm	E28 121	1
Bell reamer endpiece	E28 124	1
Wing Chisel endpiece	E28 127	1
Humeral head extractor	E28 128	1
Humeral Reamer size 4	E28 130	1
2.5mm guide wire 150mm length	E28 150	2
Trial augment +10mm	E28 154	1
Humeral cut stylus	E28 156	1
Blue plastic taper protection	E28 201	1
Starter helical chisel	E28 205	1
Trial glenoid sphere	E28 209	1
Helical baseplate impactor	E28 210	1
"I" shape chisel	E28 213	1
Standard trial insert +0	E28 216	1
Standard trial insert +5	E28 217	1
Retentive trial insert +0	E28 218	1
Retentive trial insert +5	E28 219	1
Impaction ring	E28 221	1
Helical chisel	E28 225	1
Glenoid guide wire guide	E28 228	1
3.2mm guide	E28 232	1
Glenoid sphere impactor endpiece	E28 233	1
Standard trial insert +2.5	E28 240	1
Retentive trial insert +2.5	E28 241	1
Adjustable humeral cup trial	E28 250	1
Adjustable standard insert trial	E28 251	1
Adjustable retentive insert trial	E28 252	1
Tray with lid	E28 9005	1
3.2mm, 35mm drill	S01 002	1
M6 locknut	S01 024	3
M6 Impaction shaft	S01 026	1
Flexible AO attachment	S01 033	1
3.5mm rounded hexagonal screwdriver	S01 037	1
Humeral insert forceps	E28 246	1

Revision Shoulder instrument set	E28 9102	Q
Size 0 revision broach	E28 R000	1
Size 1 revision broach	E28 R001	1
Size 2 revision broach	E28 R002	1
Size 3 revision broach	E28 R003	1
Size 4 revision broach	E28 R004	1
Broach and implant holder	E28 028	1
Distal targeting jig	E28 020	1
Crossbar	E28 023	1
M7 yellow locknut	S01 038	1
M6 T shaped locknut	S01 029	1
Large sleeved guide	H38 052	2
4.5mm - 132mm long drill guide	H38 060	1
4.5mm drill, length 195mm	H38 054	1
Locking pin depth gauge	H38 055	1
Screw holder	S01 011	1
Hexagonal screwdriver	S01 009	1
Tray with lid	E28 9002	1

Revision Glenoid instrument set	E28 9103	Q
Revision glenoid trial right	E28 238	1
Revision glenoid trial left	E28239	1
Conical drill for revision peg	E28 234	1
Back and forth reamer	E28 235	1
20mm trial revision peg	E28 242	1
25mm trial revision peg	E28 243	1
Glenoid pinning guide	E28 236	2
Tray with lid	E28 9003	1

Complementary instruments for ceramic implants		Q
Humeral ceramic insert holder	E28 215	1
Glenoid ceramic sphere holder	E28 222	1
Glenoid ceramic sphere extractor	E28 214	1

Complementary instrument set for size 00	E28 9104	Q
Tray with lid	E28 9004	1
Bell reamer endpiece Ø34.5	E28 126	1
Humeral Reamer size 00	E28 083	1
Size 00 humeral broach	E28 006	1
Trial glenoid sphere size 00	E28 200	1
Helical chisel for size 00	E28 226	1
Adjustable humeral cup trial size 00	E28 248	1
Adjustable standard insert trial size 00	E28 249	1
Size 00 Broach and implant handle	E28 029	1
Helical baseplate impactor	E28 210	1
Standard trial insert +0 size 00	E28 253	1
Standard trial insert +2.5 size 00	E28 254	1
Standard trial insert +5 size 00	E28 255	1
Insert adjuster rod	E28 027	1
Ø2.5 drill with AO attachment	S01 040	1

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