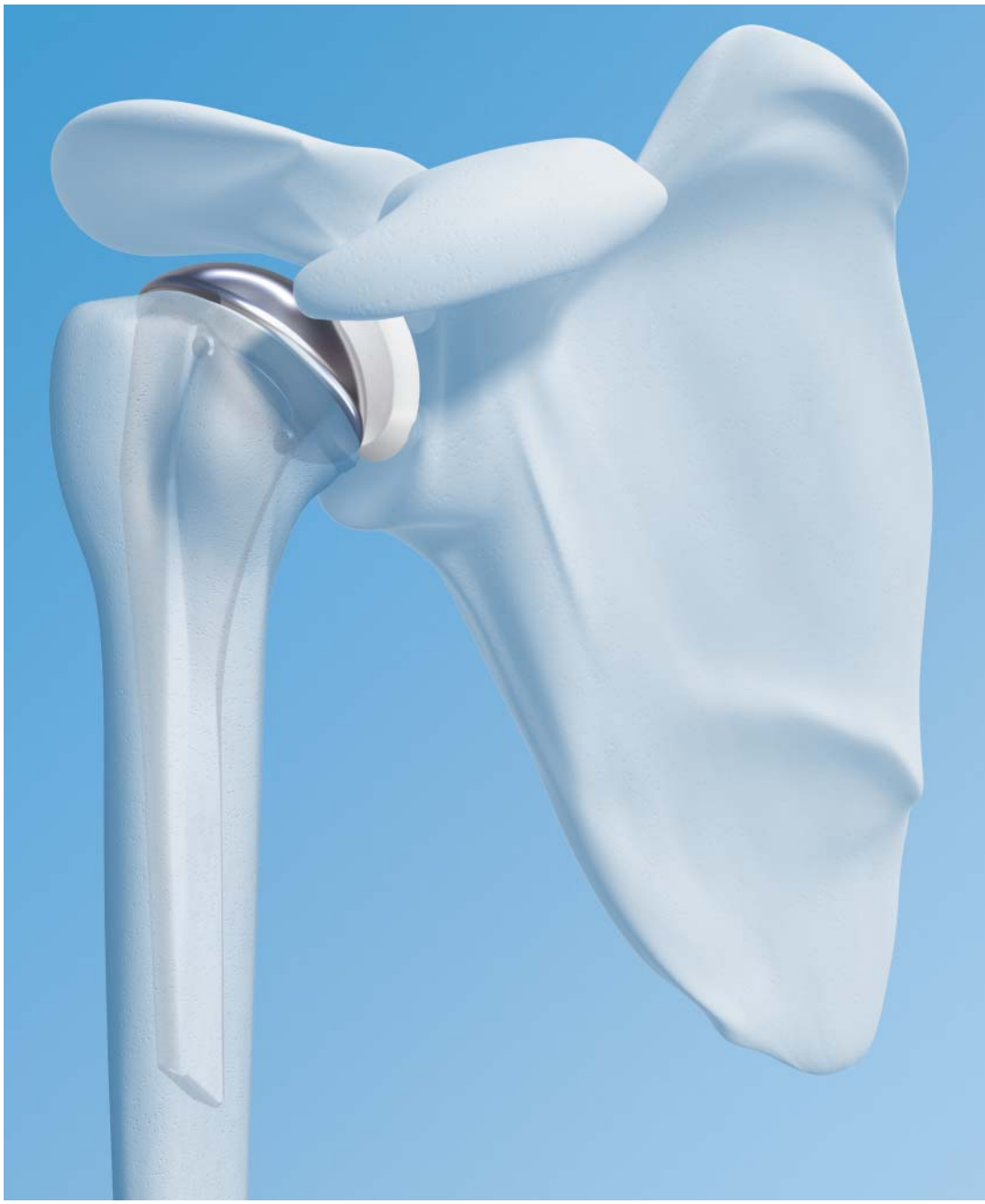
Epoca Shoulder Prosthesis System.

For hemi- and total-shoulder arthroplasty.

Technique Guide



SYNTHES®

Instruments and implants
approved by the AO Foundation

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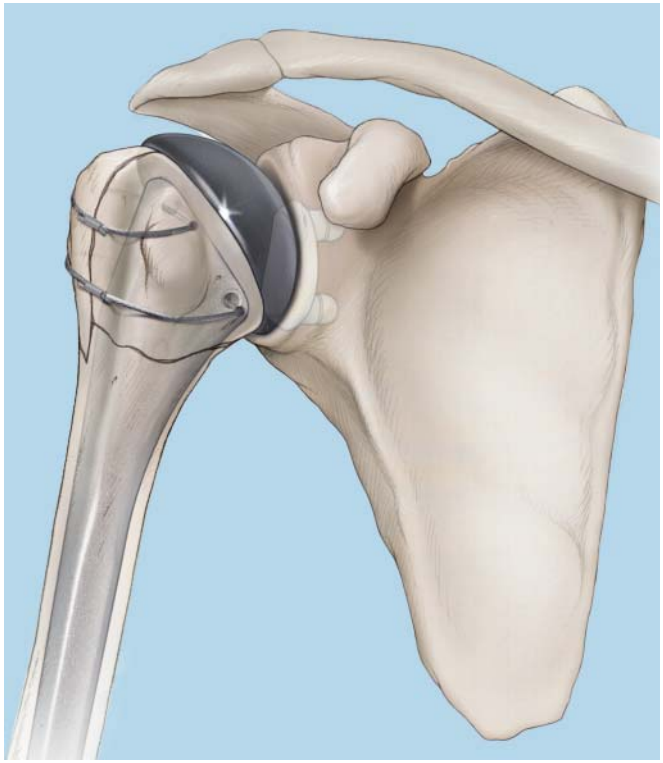
Epoca Shoulder Prosthesis System

The Synthes Epoca Shoulder Prosthesis System (Epoca) offers multiple implant options for the fixation of the proximal humerus and glenoid.



The Epoca prosthesis is intended to restore normal or near normal glenohumeral range of motion and the function of the rotator cuff. The Epoca implant reconstructs the proximal humerus while accounting for anatomical variables such as the dimension and the relative position of the head to shaft. The humeral implant consists of three components: the stem, the eccenter and the head. A glenoid component is available for total joint arthroplasty. These components can be independently combined and positioned relative to each other to reconstruct the function of the glenohumeral joint.

Specialized instrumentation

- Anatomically shaped rasps enable a precise fit of the stem implant in the medullary canal
- Simple measuring device for determining retroversion
- Trial implants ensure precise size and positioning
- System components are assembled with a calibrated press, avoiding the need for screws
- Precise and easy instrumentation supports anatomic reconstruction of the glenohumeral kinematics

Cemented stem

Head

- Height proportional to radius
- Fits the majority of the population*
- Can be adjusted for medial and posterior fit
- Diameters from 40 mm to 58 mm, in 2 mm increments, accommodate a wide range of patient sizes
- Cobalt chromium

Eccenter

- Allows medial and posterior offset adjustments independent of the head
- Titanium alloy (Ti-6Al-7Nb)

Stem

- Anatomic design mimics contour of the medial calcar and medullary canal
- Non-protruding lateral design to avoid damage to the insertion facet of the supraspinatus tendon
- Fixed inclination angle of 135°
- Medial and lateral holes in the stem for stable reattachment of the tuberosities
- Self-centering; enables reconstruction of the patient's original humeral retroversion
- Cemented: Cobalt chromium
  Press-fit: Titanium alloy with titanium plasma spray and hydroxyapatite coating
- Available in a variety of diameters and lengths

Specialized instrumentation

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* R. Hertel, U. Knothe, F.T. Ballmer. "Geometry of the proximal humerus and implications for prosthetic design." *Journal of Shoulder and Elbow Surgery* 11 (4) (2002): 331–338.

Glenoid

- Anatomic design
- Ensures congruent glenohumeral implant surfaces to achieve normal glenohumeral range of motion
- Reduced size and beveled rim for maximum mobility and reduced risk of impingement
- Radial match for even transmission of forces to the subchondral bone
- Available from 42 mm to 58 mm, in 2 mm increments
- UHMW† polyethylene

Titanium stem with titanium plasma coating

Titanium stem with titanium plasma spray and hydroxyapatite coating

CoCr stem

CoCr long stem

CoCr extra-long stem

† Ultra-high molecular weight

Indications

Indications
The Synthes Epoca Shoulder System is intended for use as a hemi- or total-shoulder replacement. It is a single-use device for reconstruction of the glenohumeral joint in the presence of complex fractures (i.e. 3 and 4 part), revision of failed fixation or arthroplasty, posttraumatic malunion and disabled, painful shoulder joints resulting from various forms of arthropathy such as osteoarthritis, rheumatoid arthritis, traumatic arthritis, or avascular necrosis and other pathologies where arthrodesis is not acceptable. The Press-fit Titanium Plasma Sprayed Humeral Stems are for cementless use only.

Contraindications
- Infections, acute or chronic, local or systemic
- Severe muscular, neurological, or vascular deficiencies, which compromise the affected extremity
- Destruction of bone or poor bone quality which may affect stability of the implant
- Any concomitant disease which may compromise the function of the implant

Preoperative Planning

Complete the preoperative radiographic assessment with standard AP, lateral Y and axillary views. A CT scan is required when an axillary view of the fractured or degenerative humerus is not obtainable. For preoperative planning, an AP view of the contralateral humerus is helpful. Use the AP view of the contralateral side to estimate the size of the prosthesis.

Place the preoperative template on the AP view of the contralateral humerus. To estimate the stem size, measure the width of the medullary canal at the most cylindrical portion of the shaft and choose the largest size implant that fits. Estimate the size of the head.

Place the template over the AP view of the fractured or pathological side to consider the patient's anatomy.

Optional

For glenoid component

Complete the preoperative radiographic assessment with the standard AP, lateral Y and axillary views and a CT scan.

Axial CT scan views of the glenoid are essential for assessing the amount of posterior erosion of the glenoid, to determine how much anterior reaming will be necessary to gain correct retroversion.

A normal glenoid has a retroversion range between 5° and 10°. The inclination of the glenoid in the frontal plane requires adjustment to avoid subacromial impingement and/or inferior instability.

Note: Refer to the contralateral side to compare the degree of superior and inferior erosion.

A CT-based three-dimensional reconstruction of the glenoid (without the humeral head) helps to estimate the shape and size of glenoid osteophytes. Use this image to plan the precise resection of the osteophytes and positioning of the implant.

Position patient

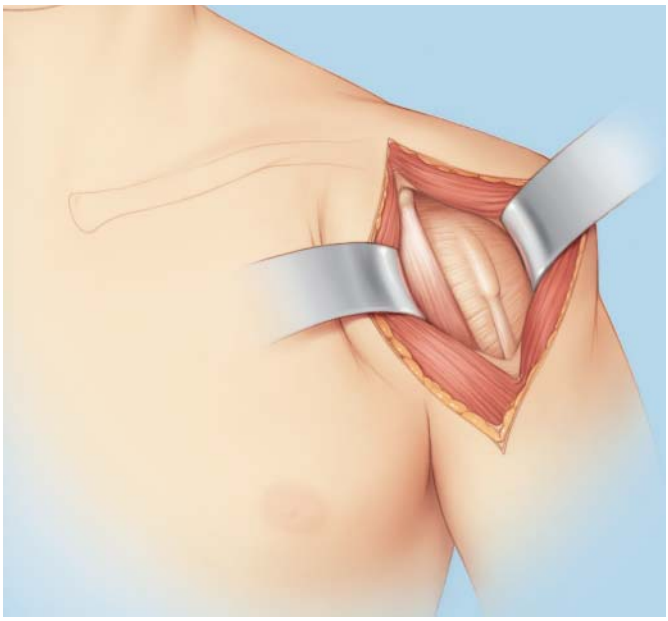
Position the patient in a modified beach-chair position on an OR table.

Ensure that the arm is freely extendable.

1
Approach

"Henry's" anterior strap approach
Start the incision over the acromioclavicular joint, and extend it 8 cm inferior over the anterior deltoid, lateral to the deltopectoral groove. Open the fascia over the deltopectoral groove and identify the cephalic vein. Retract the deltoid with the cephalic vein laterally, and the pectoralis major medially.

Incise the clavipectoral fascia and retract the biceps brachii and coracobrachialis medially.*



2
Expose fracture

Resect the clavipectoral fascia. Irrigate and remove the hematoma to expose the fracture. Check the vascularity of the humeral head to confirm that joint replacement is the optimal form of care.

Pass stay sutures through the infraspinatus tendon for manipulating the greater tuberosity fragment.

Expose the biceps tendon. Suture the biceps tendon to the pectoralis major fascia. Transect the biceps at the level of the transverse ligament.

Locate the split in the supraspinatus tendon induced by the fracture. Open the split in the supraspinatus tendon for better access to the humeral head.

Retrieve the fractured humeral head and preserve for later use. Examine the glenoid. Consider ORIF or glenoid replacement if there is a concomitant fracture of the glenoid.

* Stanley Hoppenfeld and Piet deBoer, Surgical Exposures in Orthopaedics—*The Anatomic Approach,* Third Edition, 2003, pp. 2–8.

3

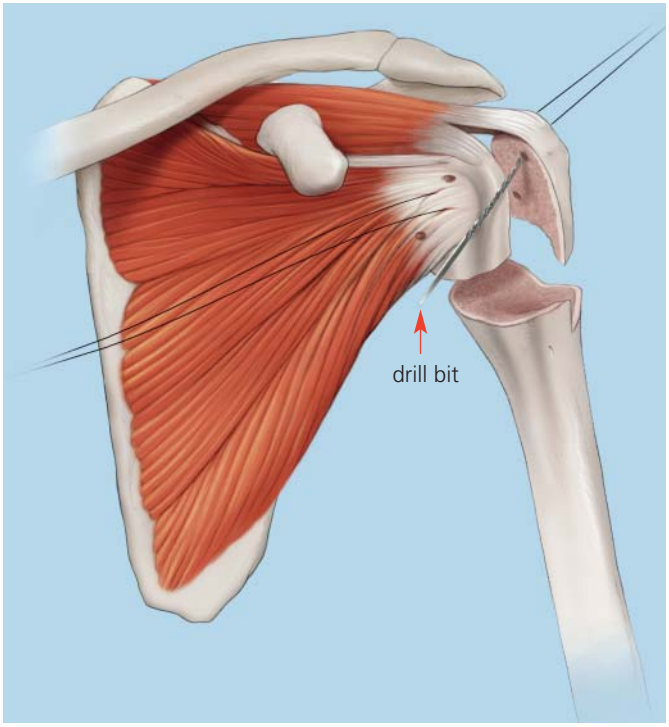
Prepare tuberosities for later fixation

Pass sutures through the subscapularis tendon to secure the lesser tuberosity fragment.

Pass sutures through the supraspinatus and infraspinatus tendons to secure the greater tuberosity and the lesser tuberosity. Drill two holes in the greater tuberosity and the lesser tuberosity with a 2.0 mm drill bit. The two holes should be roughly aligned with the medial and lateral holes of the prosthetic stem. Drill the holes close to the point of transition from tendon to bone.

Pass cables, cerclage wires, or high strength sutures through the drilled holes of the greater tuberosity. Metallic fixation with cables or cerclage wires is recommended. Park the cables, wires or sutures so that they do not interfere with the remaining steps of the procedure.

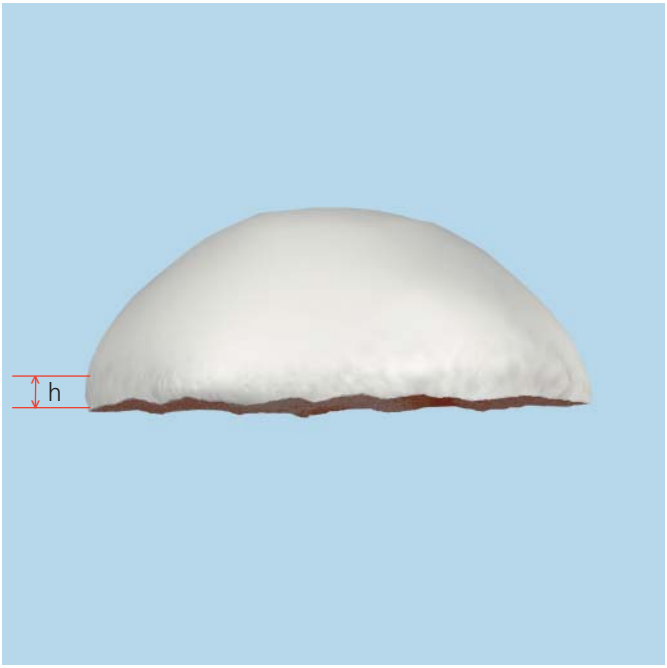
Expose the shaft by extending, adducting, and externally rotating the humerus.



4

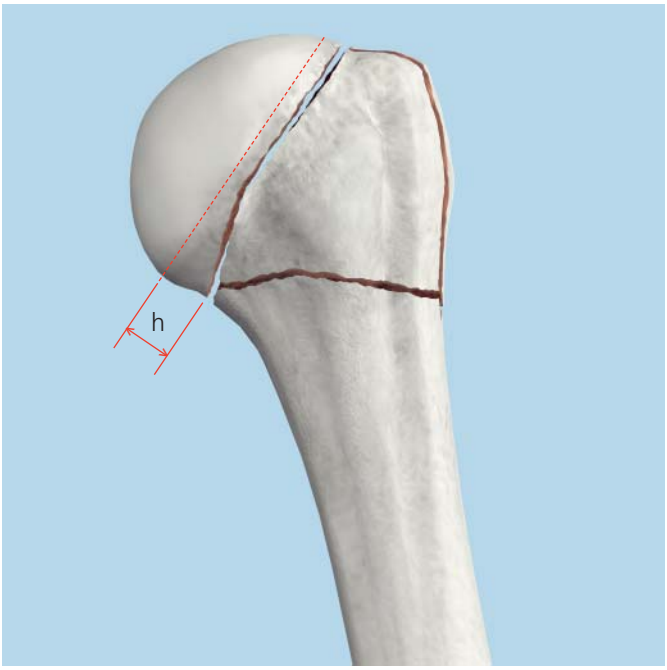
Determine stem height

Measure the medial metaphyseal extension "h" of the retrieved head to determine the height that the stem should protrude from the humeral shaft. Note the height in mm for later reference.



Alternative technique
Reduce the original head to its anatomic position using the medial fracture landmarks. The retrieved head can be temporarily affixed using a K-wire. Measure the height of the medial metaphyseal extension attached to the articular surface of the humeral head. This determines the seating height of the prosthetic stem, i.e. the height of the cartilaginous transition zone.

The anatomic neck line of the prosthesis stem should ultimately be aligned to the normal anatomic neck line.



5
Select trial head

Instrument	
E5114-40–E5114-54	Trial Heads, sizes 40 to 54

Osteotomize any remaining metaphyseal extension to visualize the size of the anatomic head. Compare the retrieved humeral head with the available trial heads. Choose the trial head that closely matches the retrieved humeral head. Save the humeral head for later use as bone graft.

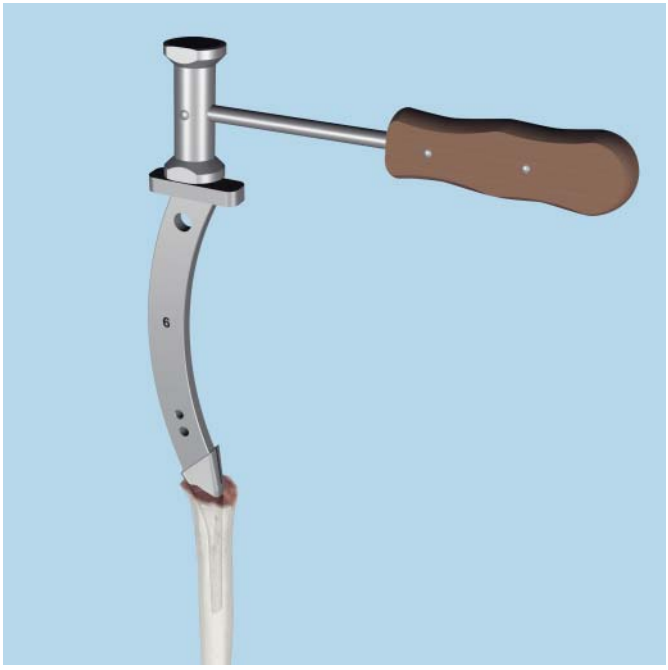
Notes:
If the AP and lateral radii differ, choose an intermediate trial head size.

When in doubt, always choose the smaller head. If needed, shave the edges of the shaft to allow the head of the shaft to seat properly.

6
Open medullary canal and determine retroversion

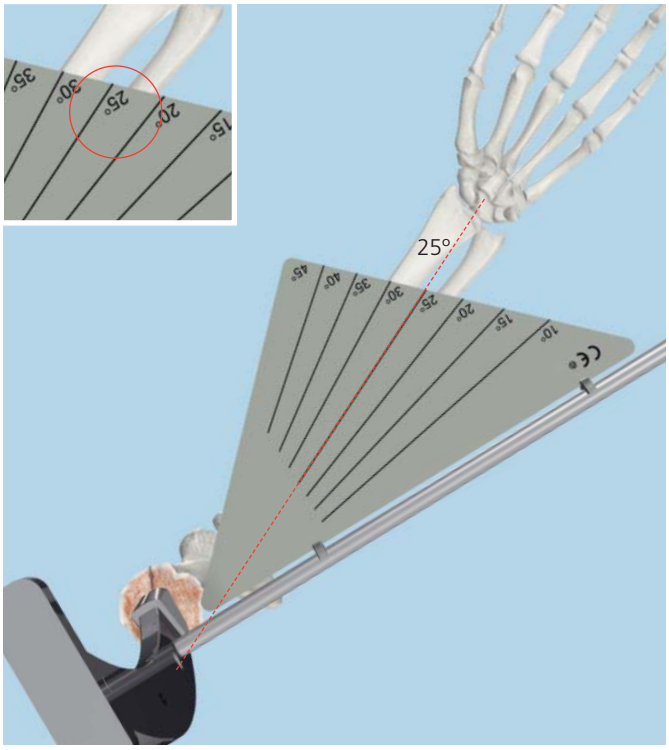
Instruments	
399.41	Hammer, 350 g
E5115-1	6.0 mm Retrotorsion Bar
E5115-2	Goniometer
E5112-6– E5112-14	Rasps, sizes 6 to 14

Insert the distal end of the size 6 rasp into the canal. Check the rotational alignment of the rasp, thread the 6.0 mm retrotorsion bar into the threaded hole of the rasp and slide the goniometer onto the lateral side of the retrotorsion bar. Looking down over the patient's shoulder at where the goniometer aligns with the forearm, adjust the position of the rasp until the forearm aligns with 25° on the goniometer. This measurement reflects the median retroversion of the patient population.*



Optional technique: For insertion of long and extra long Epoca stems

Use a straight reamer or a flexible reamer. Ream to a diameter of 2.0 mm greater than the stem. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Flush the surgical site after reaming to remove remaining debris. Use the standard rasp to shape the proximal part of the medullary canal following the standard technique. Determine the head offset and assemble the definitive implant accordingly.



Proceed to Step 12.

* R. Hertel, U. Knothe, F.T. Ballmer. "Geometry of the proximal humerus and implications for prosthetic design." *Journal of Shoulder and Elbow Surgery* 11 (4) (2002): 331–338.

6

Open medullary canal and determine retroversion continued

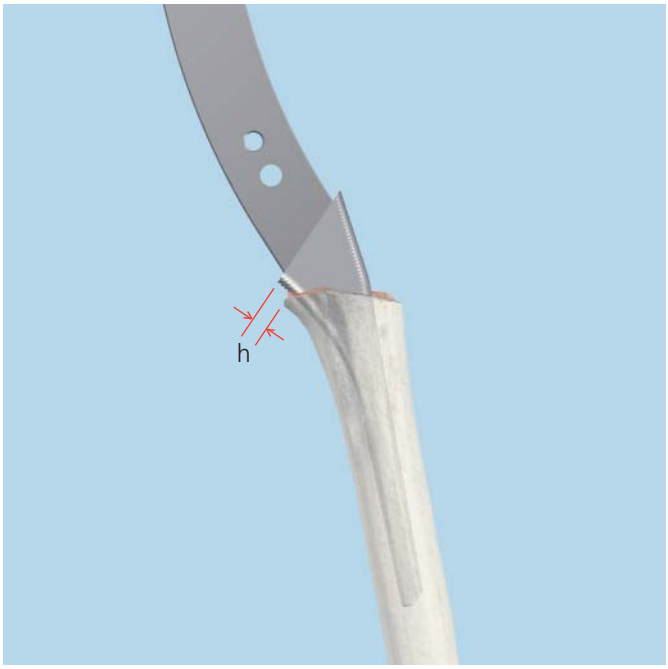
Note: It is important to adjust the retroversion at this stage as it will be difficult to change once the rasping process is complete.

Lightly tap the top of the rasp with the 350 g hammer until the medial side of the rasp protrudes in accordance with the previously measured height of the metaphyseal extension. As the shape of the rasp is self-centering and self-rotating, it will follow the contour of the canal and self-center itself. Use a curette to remove any bone obstructing the advancement of the rasp, especially in the medial medullary canal.

Confirm the retroversion by cross-checking against the bicipital groove. The distance between the deepest point in the bicipital groove and the center etch of the rasp should be approximately 8 mm.* Should this fail, use the median anatomical value of 25°.

Continue rasping with incrementally larger sizes until the exposed area is equivalent to the metaphyseal extension "h" measured in Step 4. If the rasp is too large for the medullary canal, the rasp will protrude more than the determined height. The last rasp that fits into the canal with the desired amount of area protruding from the canal determines the stem size for implantation.

Remove rasp.



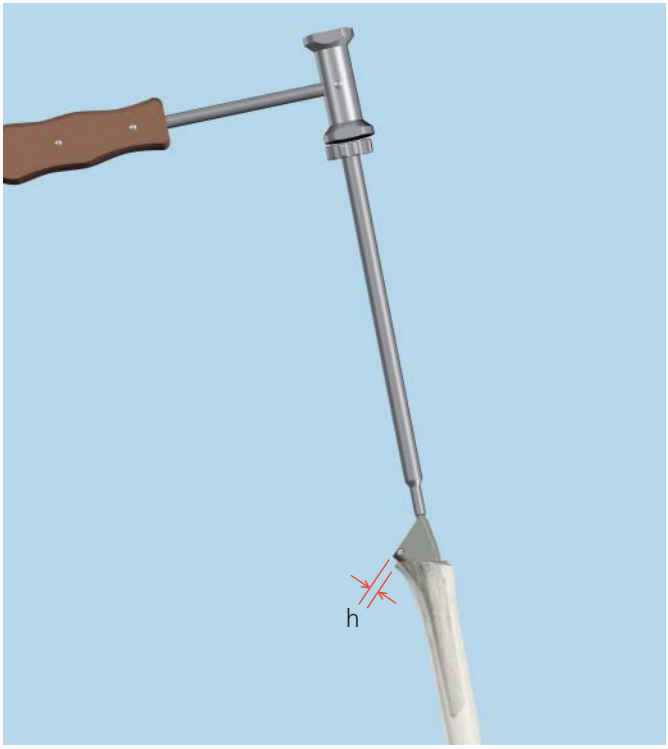
* A. Hempfing, M. Leunig, F.T. Ballmer, R. Hertel, "Surgical landmarks to determine humeral head retrotorsion for hemiarthroplasty in fractures." *Journal of Shoulder and Elbow Surgery* 10(5) (2001): 460–3.

7
Insert trial stem

Instruments	
399.41	Hammer, 350 g
E5113-6– E5113-14	Trial Stems, sizes 6 to 14
E5115-2	Goniometer
E5115-3	Inserter/Extractor for Trial Stem
E5115-6	3.0 mm Retrotorsion Bar

Attach the inserter/extractor to the proximal hole of the selected trial stem. Use the 350 g hammer to apply controlled light blows to the top of the inserter/extractor. Hammer until the trial stem protrudes above the shaft, as determined in Step 4.

To confirm the retroversion of the trial stem, insert the 3.0 mm retrotorsion bar into the hole of the trial stem. Use the goniometer to measure the retroversion.



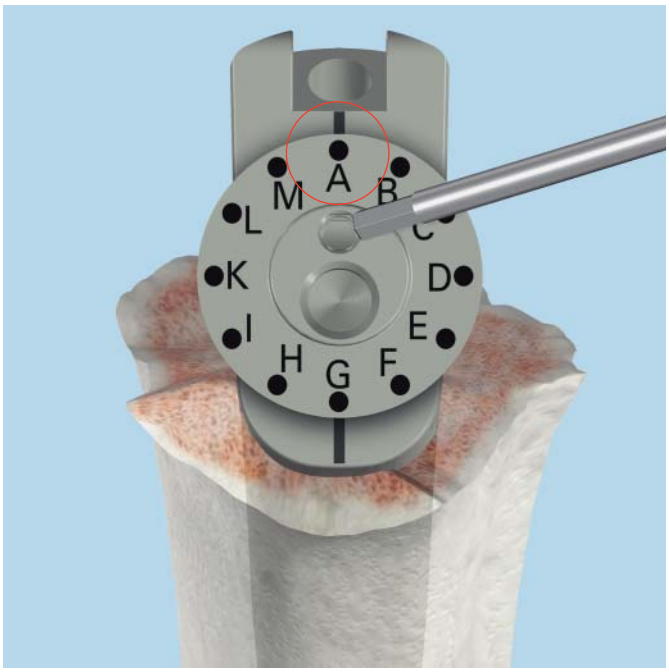
8
Attach trial eccenter

Instruments	
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant
E5117-20	Trial Eccenter

Attach the trial eccenter to the trial stem.

Align the letter ‘A’ on the trial eccenter with the proximal line on the trial stem. This position reflects the median offset.

Lock the trial eccenter in place using the 2.0 mm hex screwdriver in the proximal hole.



9

Attach trial head

Instruments

E5114-40– E5114-54	Trial Heads, sizes 40 to 54
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant
E5115-4/3	2.5 mm Hex Screwdriver for Trial Implant

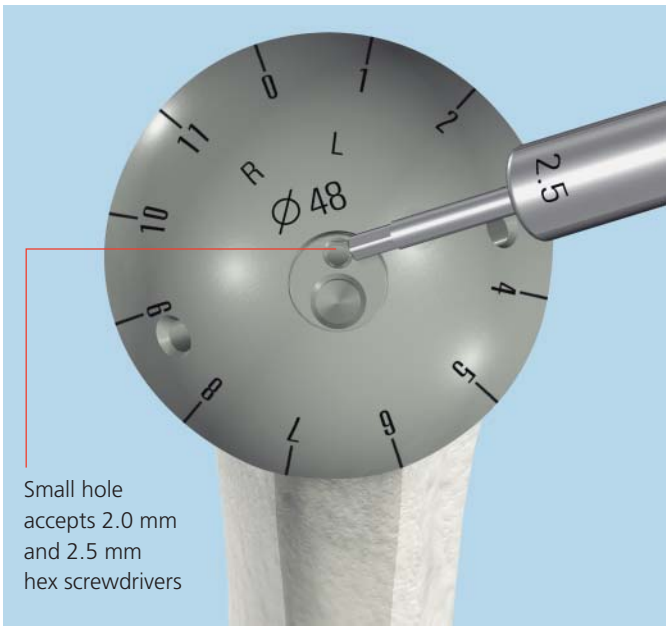
Back out the setscrews from the trial head, using the 2.0 mm hex screwdriver to prevent impingement on the trial eccenter.

Note: Be careful not to fully back out the setscrews, as they may fall out.

Mount the trial head on the trial eccenter. Align the appropriate marking on the trial head with the center line on the trial stem ('L' for left humerus, 'R' for right humerus).

Lock the trial head in position by tightening the anterior setscrew with the 2 mm hex screwdriver. Verify that the offset is appropriate for the patient's anatomy.

If the offset is not appropriate, adjust either the antero-posterior position or the mediolateral position. Loosen the trial eccenter by inserting the 2.0 mm hex screwdriver in the proximal hole of the trial head-trial eccenter assembly. Replace the 2.0 mm hex screwdriver with the 2.5 mm hex screwdriver and rotate the trial eccenter until the desired head position is achieved.



For further adjustment, loosen the anterior setscrew on the trial head with the 2.0 mm hex screwdriver and manually rotate the trial head until the desired position is achieved. Lock the position by tightening the setscrew.

Note: Always use the 2.0 mm hex screwdriver to tighten and loosen the trial eccenter and setscrews. The 2.5 mm hex screwdriver is only used to rotate the eccenter.

Record the offset position of the trial head.

10

Remove trial implants

Instruments	
399.41	Hammer, 350 g
E5115-3	Inserter/Extractor for Trial Stem
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant

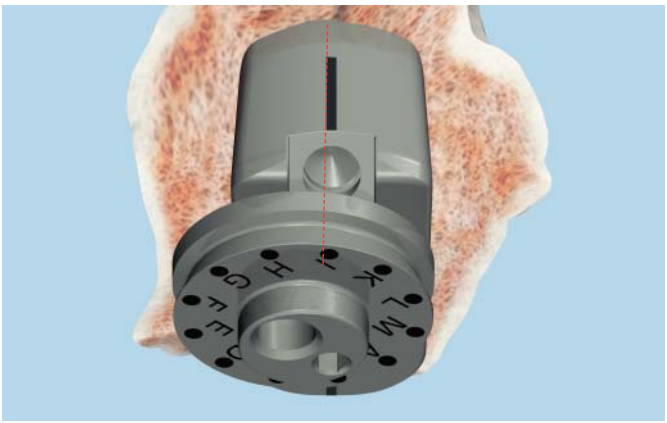
Remove the trial head using the 2.0 mm hex screwdriver.

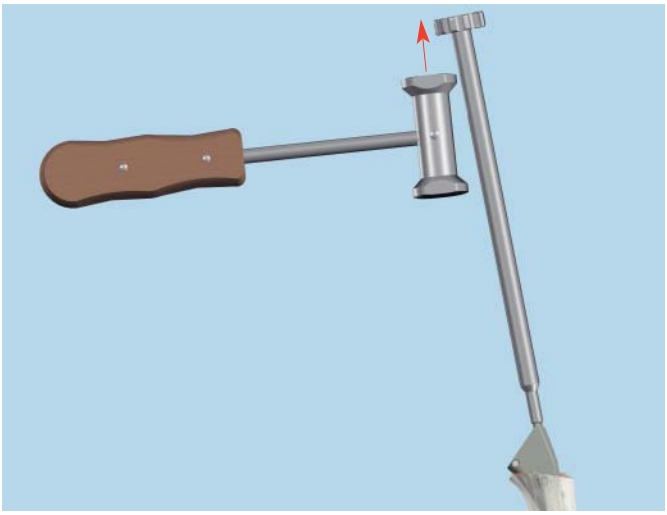
Record the offset position of the trial eccenter.

Note: It is critical to record the determined number and letter of the trial implants, as these will ultimately be transferred to the final implants.

Remove the eccenter using the 2.0 mm hex screwdriver. Thread the inserter/extractor into the proximal hole of the trial stem. Lightly tap the top of the inserter/extractor to back out the trial stem.

Note: Ensure that the inserter/extractor is fully threaded into the trial stem to avoid possible detachment during removal.





11
Assemble implants

Instruments	
E5115-5/1	Press
E5115-5/3	Eccenter Impactor
E5115-5/4	Torque Wrench for Press
E5115-5/6– E5115-5/14	Stem Holders for Press, sizes 6 to 14

Note: The press requires autoclavable oil prior to use.

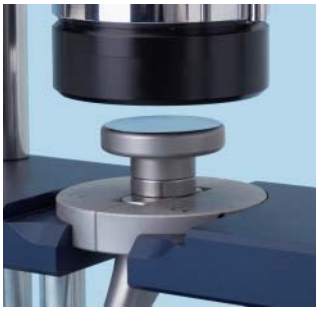
Choose the same-sized stem holder as the stem that was determined for implantation. Orient the half of the stem holder with the two pegs so that the etched side is facing up. With the distal end of the stem toward the operator, insert the two pegs of the stem holder through the corresponding holes of the stem. Place the other half of the stem holder on the opposite side of the assembly. This allows the stem assembly to lie stable in the press.

Important: Ensure the etched side of the stem holder is facing up. Improper assembly may cause jamming.

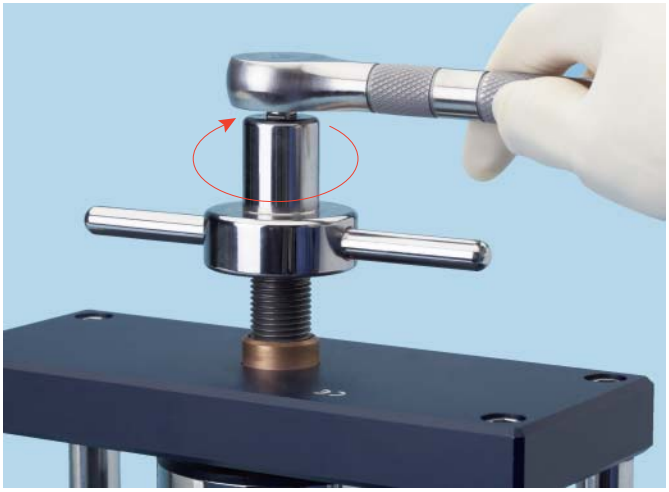
Position the eccenter on the stem. Align the letter recorded during trial implantation (Step 9) with the lateral side of the center line on the stem.

Place the assembly in the press and position the eccenter impactor over the eccenter.

Note: Handle coated stems with care to avoid disrupting the coating.



Using the torque wrench, turn the handle of the press clockwise in a controlled, slow motion. Tighten the wrench until two clicks are heard, signifying the positive engagement of the eccenter and the stem.



Turn the torque wrench counterclockwise and remove the eccenter impactor. Remove the stem-eccenter assembly from the press.

Remove half of the stem holder, leaving the half with the pegs still engaged in the holes of the stem. Place the head on the stem assembly. Align the recorded offset position with the edge of the stem holder. Replace the other half of the stem holder, being careful not to disrupt the head offset position.

Note: Ensure that the etched side is readable, to allow proper positioning and to prevent jamming.

Place the head and the stem assembly in the press. Compress components in the press by turning the torque wrench clockwise in a controlled, slow motion. Tighten the wrench until two clicks are heard, signifying the positive engagement of the head.

Remove the implant from the press by turning the torque wrench counterclockwise. Remove the stem holder from the implant.

Note: Once assembled, no visible gap should be present between the base of the head and the humeral stem.

12
Implant prosthesis

Note: Choose final implantation method according to the type of stem being used.

Final implantation for CoCr cemented stems

Instruments	
399.41	Hammer, 350 g
E5115-2	Goniometer
E5115-6	3.0 mm Retrotorsion Bar
E5115-7	Head Impactor

Thread the end cap onto the head impactor.

Note: Follow the manufacturer's instruction for preparation, injection, and setting of bone cement.

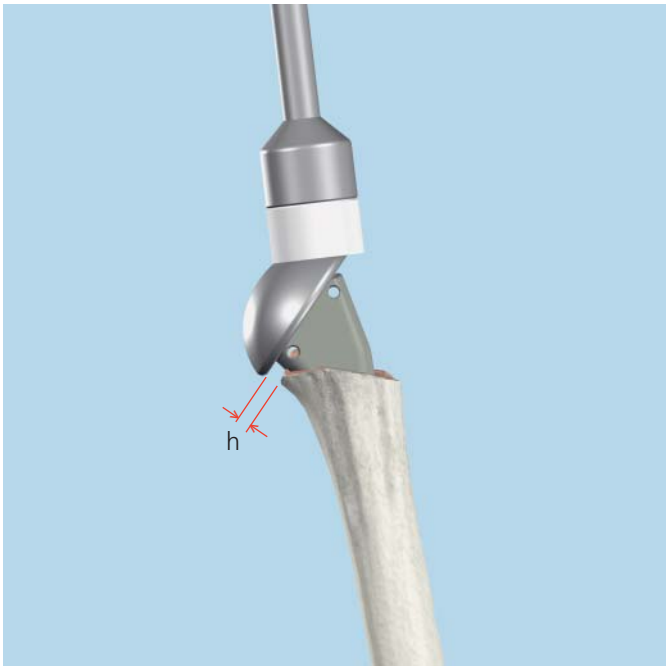
Do a final irrigation and suction of the medullary canal to remove blood and bone debris. Insert a synthetic cement restrictor into the medullary canal to prevent excess cement from flowing into the distal humerus.

Place a vent tube in the medullary canal. Dry the cavity. Inject cement into the canal. Remove the vent tube while the cement is being injected.

Ensure that the implant assembly is clean before inserting it into the medullary canal. Check the final retroversion using the 3.0 mm retrotorsion bar and the goniometer.

Tap lightly on the head with the head impactor until fully seated. Remember to ensure that the implant sits proud from the shaft at the predetermined height "h".

Remove any excess bone cement before it sets, to provide room for bone graft.



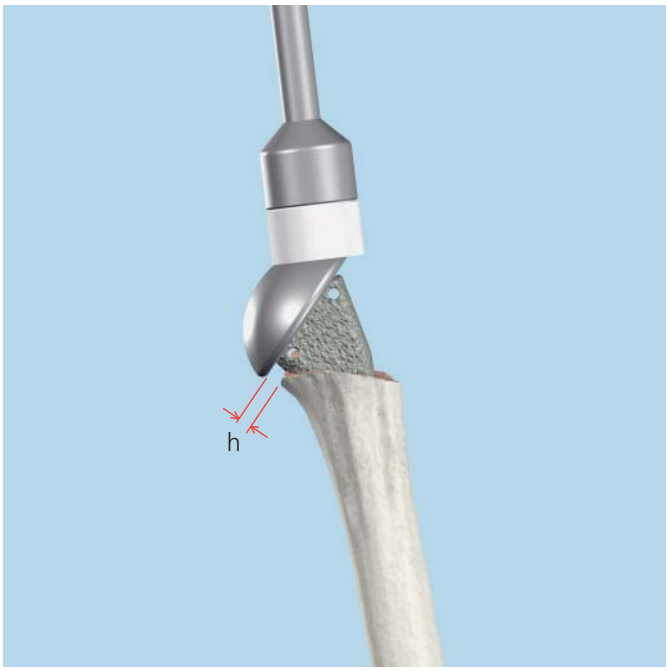
Final implantation for titanium press-fit stems

Instruments	
399.41	Hammer, 350 g
E5115-2	Goniometer
E5115-6	3.0 mm Retrotorsion Bar
E5115-7	Head Impactor

Thread the end cap onto the head impactor.

Introduce the prosthesis into the medullary canal. To confirm proper placement and orientation of the implant, use the 3.0 mm retrotorsion bar and the goniometer to recheck the retroversion.

Tap lightly on the head with the head impactor until fully seated. Ensure that the implant sits proud from the shaft at the predetermined height “h”.

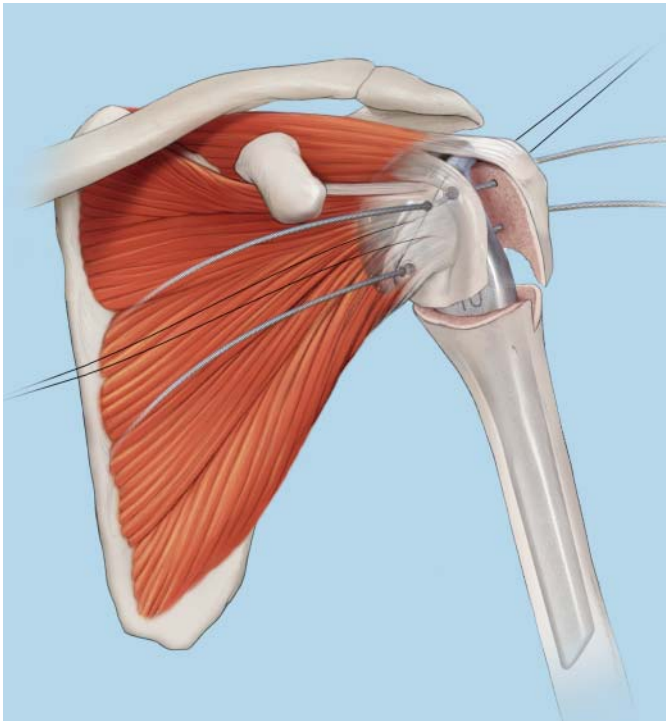


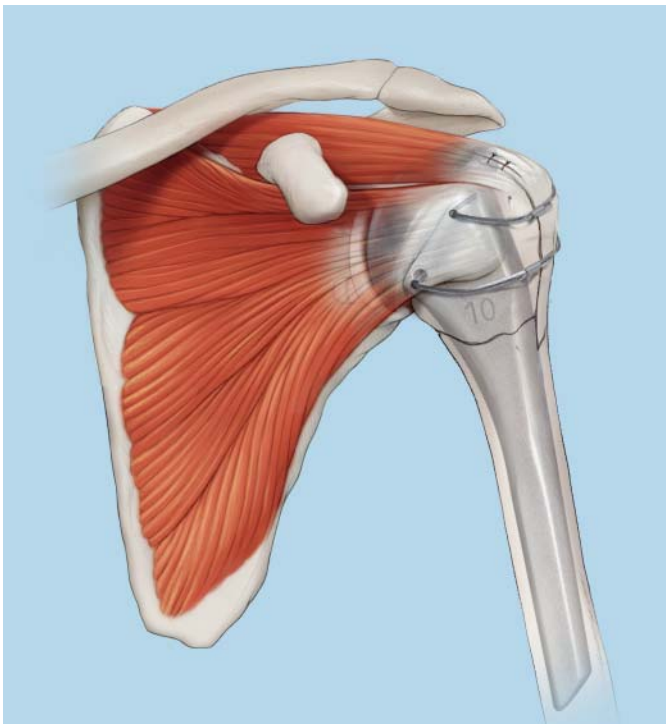
13

Reduction and stable fixation of the tuberosities

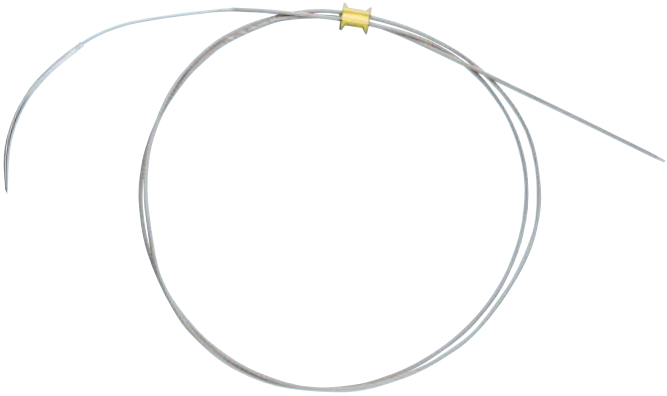
Pass the cables that were initially placed in Step 3 in the greater and lesser tuberosity/rotator cuff junction through the medial and lateral holes of the stem.

Reduce the joint, i.e., the prosthetic head to the glenoid and the greater tuberosity. Pass the cable through the lesser tuberosity. Reduce the lesser tuberosity to the prosthesis. Use sutures to readapt the split in the rotator cuff to obtain preliminary reduction of the tuberosities. Avoid over-reduction of the greater tuberosity, especially in a distal direction. The most medial insertion line of the supraspinatus must be flush with the edge of the prosthetic head, not distal to it. Fill any void under the tuberosity with cancellous bone graft harvested from the retrieved head. Use absorbable sutures for preliminary reduction and adaptation of relevant fragments.





Optional technique: Using the 1.0 mm titanium needle cable



Indications for 498.821S
The 1.0 mm Titanium Needle Cable (498.821S) is indicated for general trauma surgery involving the olecranon, patella, femur (including periprosthetic fractures), humerus and ankle; acromioclavicular dislocations, pelvic and acetabular fractures, prophylactic banding during total joint procedures, and temporary reduction during open reduction internal fixation procedures.

The 1.0 mm cable with crimp is contraindicated for use in the femur ORIF and prophylactic banding during total joint procedures. These devices are intended as single use items.

Note: The cable cannot be passed from posterior to anterior due to the deltoid muscle.

The cable has a needle tip that allows for easier passing of the cable. Pass both cables through the greater tuberosity and through the medial and lateral holes of the stem.

Once both cables are passed through the greater tuberosity and the stem, pass both cables through the lesser tuberosity. Cut the needle end of the leader, not on the cable, using the cable cutters.

Reduce the greater and lesser tuberosity to the prosthesis. Avoid overreduction of the greater tuberosity, especially in a distal direction.

Note: Both cables must wrap around the rotator cuff.

1

Position cable crimp

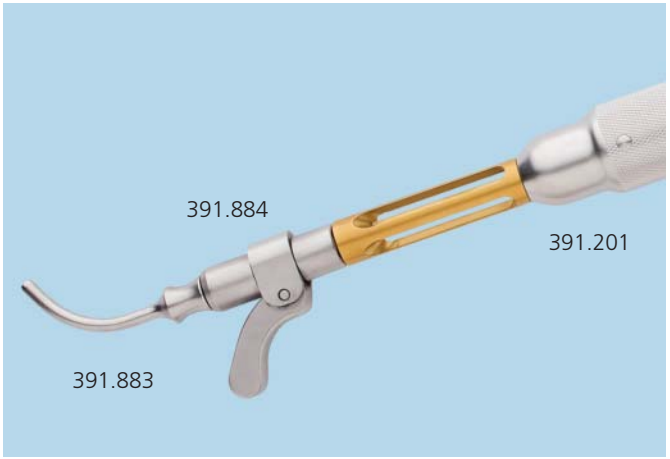
Insert one end of the cable into the open hole in the cable crimp and place the crimp on the bicipital groove. Ensure that the points on the under surface of the cable crimp are in contact with the bone—the smooth surface should be facing up.

Optional technique: Using the 1.0 mm titanium needle cable *continued*

2

Tension cable

Instruments	
391.201	Cable Tensioner
391.883	Attachment Bit
391.884	Provisional Tensioning Device



Attach the provisional tensioning device and the attachment bit to the cable in the crimp. Engage the cam to lock by pulling back on the provisional tensioning device. This will hold the cable against the crimp while applying tension to the other side.

Attach the cable tensioner to the provisional tensioning device and the attachment bit. Turn the fluted knob at the end of tensioner fully clockwise until it stops, and thread the cable through the cable tensioner. Advance the tensioner along the cable until it resets against the cable crimp. Carefully take up any slack in the cable by hand. Confirm placement of the crimp on the bone.

Turn the knob on the tensioner clockwise until the desired tension is reached. The amount of tension being applied to the cable is indicated by the position of the knob relative to the numbered lines etched on the body of the tensioner. These lines indicate tension levels from 20 kg to 40 kg. When the desired tension is reached the cable is ready for crimping.

Note: Applying more than 40 kg of tension to the 1.0 mm cable may cause fraying or breakage of the cable. It may also cause crushing of bone fragments and loss of reduction.

Technique tip: The provisional tensioning device may be detached from the tensioner to hold tension in the cable while additional cables are placed. Engage the cam lock by pulling back on the provisional tensioning device. Each cable can then be incrementally tensioned before final crimping.

3
Crimp cable

Instrument	
391.882	Cable Crimper

Place the jaws of the cable crimper over the cable crimp and squeeze the handles together. The ratchet mechanism in the crimper precisely controls the amount of crimp deformation, thus preventing under- or overcrimping. The crimper will automatically release when the cable has been crimped.

Note: Visually check to ensure that the cable crimp is centered and fully seated in the crimper jaws prior to crimping the cable. Improper placement may lead to cable slippage or crimp failure.

After the cable has been crimped, remove the tensioner from the cable by turning the knob counterclockwise until the cable slides freely through the tensioner. Crimp additional cables using the same procedure.

To cut the cable, pass the free end of the cable through the jaws of the cable cutter and squeeze the handles together. Each cable should be cut as close to the cable crimp as possible, taking care not to damage the adjacent cable.

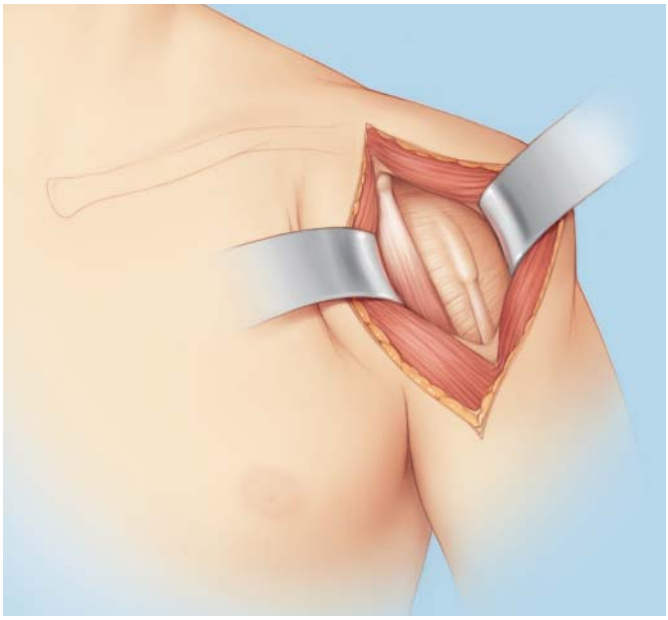
Technique tip: Completely place the cable in the cutter jaws, but near the tip. Cut in one motion to ensure a clean cut.

Applying the cable is now complete.

1
Approach

"Henry's" anterior strap approach
Start the incision over the acromioclavicular joint, and extend it 8 cm inferior over the anterior deltoid, lateral to the deltopectoral groove. Open the fascia over the deltopectoral groove and identify the cephalic vein. The vein is an important landmark to identify the interval between the deltoid and pectoralis major muscles. Retract the deltoid with the cephalic vein laterally, and the pectoralis major medially.

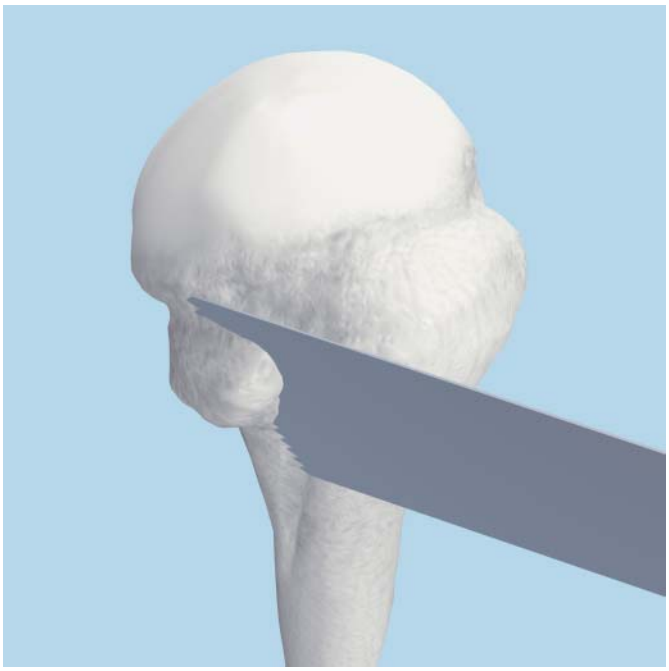
Incise the clavipectoral fascia and retract the biceps brachii and coracobrachialis medially.*



2
Expose joint

Detach the subscapularis for access to the humeral head by performing an osteotomy of the lesser tuberosity. Expose the biceps tendon. Suture the biceps tendon to the pectoralis major fascia. Transect the biceps at the level of the transverse ligament. Expose the upper border of the subscapularis tendon, the bicipital groove, and the lower border of the subscapularis muscle. Hold the oscillating saw against the deepest point of the bicipital groove. Internally rotate the arm. Incline the saw blade in an anterior direction until it touches the posterior rim of the bicipital groove. Make a cut approximately 10 mm deep. Use a 15 mm broad chisel and break the remaining bone bridge. The bone will break along the rim of the lesser tuberosity, i.e. at the anatomic neck. Pass two stay sutures through the subscapularis tendon, close to the tendon-bone junction.

Option
Detach the subscapularis tendon from its insertion at the lesser tuberosity. Secure the tuberosity with sutures.



* Stanley Hoppenfeld, Piet deBoer. *Surgical Exposures in Orthopaedics—The Anatomic Approach*. 3rd Edition. Philadelphia, PA : Lippincott Williams & Wilkins. 2003: 2-8.

Adduct, extend and externally rotate the arm to expose the inferior capsule. Detach the inferior capsule close to the humerus as external rotation increases.

Remove the osteophytes around the anatomic neck with a chisel, as they impede the movement and make the head seem bigger than it is.

3

Release subscapularis tendon

Retract the proximal humerus dorsally with a ring retractor (Fukuda retractors). Identify the axillary nerve. Release and resect a strip of the anterior capsule. Release the fibrous bands that may tether the upper tendinous rim of the subscapularis to the base of the coracoid. Release the inferior capsule in line with the lower muscular fibers of the subscapularis (be cautious not to injure the axillary nerve, which runs at 90° to the capsular cut). Carefully release the bursal reflexion anterior to the subscapularis; take care to avoid injury to the two motor branches innervating the subscapularis.

Release the posterior capsule

The posterior capsule is released as needed. Expose the posterior capsule using a ring-spreader. Resect a strip of the posterior capsule close to the glenoid rim until muscle fibers of the supra- and infraspinatus are visible.

Expose the proximal humerus for further preparation

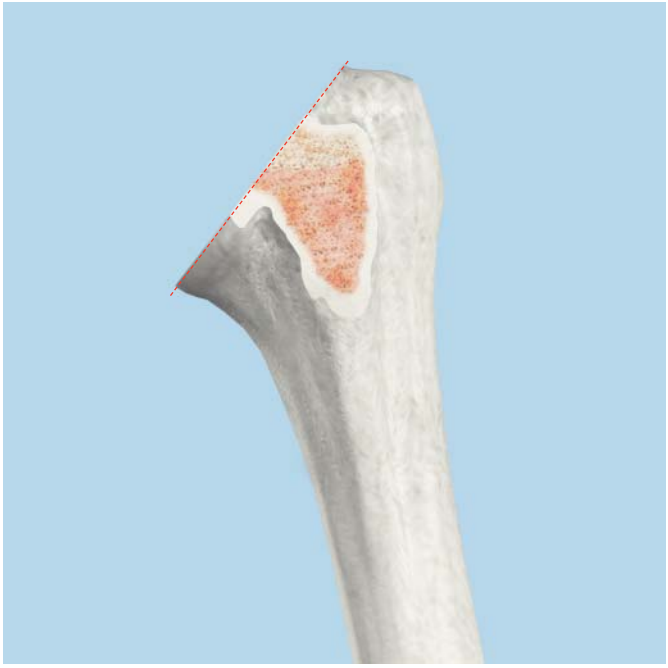
Expose the humeral head by introducing two blunt Hohmann bone retractors in the joint space and place them behind the humeral head. Bring the arm in adduction, extension and external rotation. Should the exposure still be insufficient, release the proximal one-third of the latissimus dorsi tendon.

4

Perform initial resection of humeral head

Identify the anatomic neck line and the most medial insertion line of the supraspinatus. Start the osteotomy at this location. Aim for a resection which ends a few millimeters above the anatomic neck line medially.

Note: It is important to follow the landmarks for the initial osteotomy. If the osteotomy does not start at the medial insertion line of the supraspinatus, the reconstruction of the anatomy will be compromised.



5

Select trial head size

Instrument

E5114-40–E5114-54	Trial Heads, sizes 40 to 54

Select the trial head size that closely matches the resected humeral head.

Notes:
If the AP and lateral radii differ, choose an intermediate trial head size.

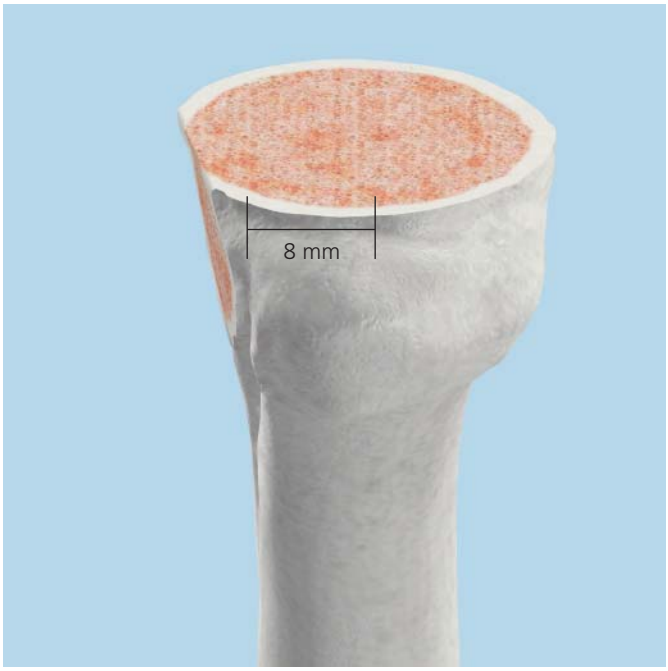
When in doubt, always choose the smaller head. If needed, shave the edges of the humeral shaft to allow the head to seat properly.

6
Open medullary canal

Instruments	
399.41	Hammer, 350 g
E5112-1	Cylindrical Rasp

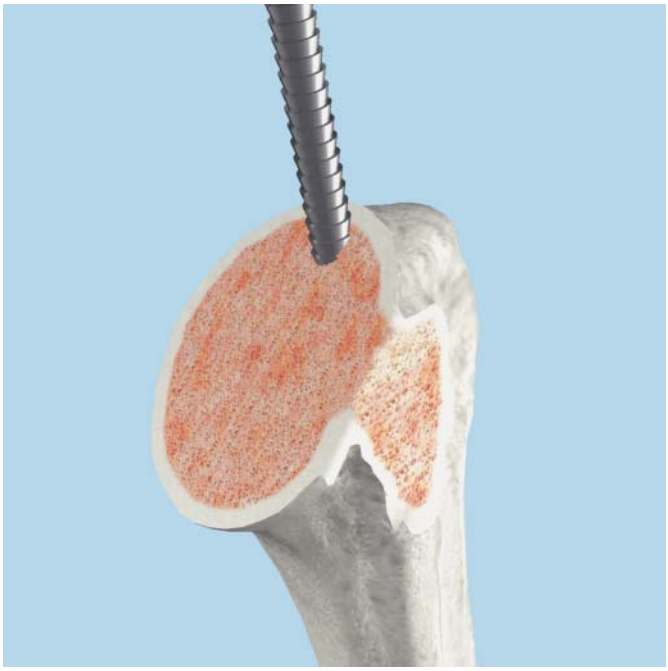
Use the cylindrical rasp to open the humeral shaft. Start 8 mm posterior to the deepest point of the bicipital groove and close to, but not on, the medial insertion line of the supraspinatus. Lightly hammer the top of the cylindrical rasp until it enters the medullary canal. Remove the cylindrical rasp and insert a curette to palpate the anatomy of the medullary canal.

Note: If the cancellous bone is hard, it is recommended to remove medial bone with a rongeur, a chisel, or a sharp curette in order to allow full seating of the rasps.



Optional technique: For insertion of long and extra long Epoca stems

Use a straight reamer or a flexible reamer. Ream to a diameter of 2.0 mm greater than the stem. Ream in 0.5 mm increments and advance the reamer with steady, moderate pressure. Do not force the reamer. Flush the surgical site after reaming to remove remaining debris. Use the standard rasp to shape the proximal part of the medullary canal following the standard technique. Determine the head offset and assemble the definitive implant accordingly.



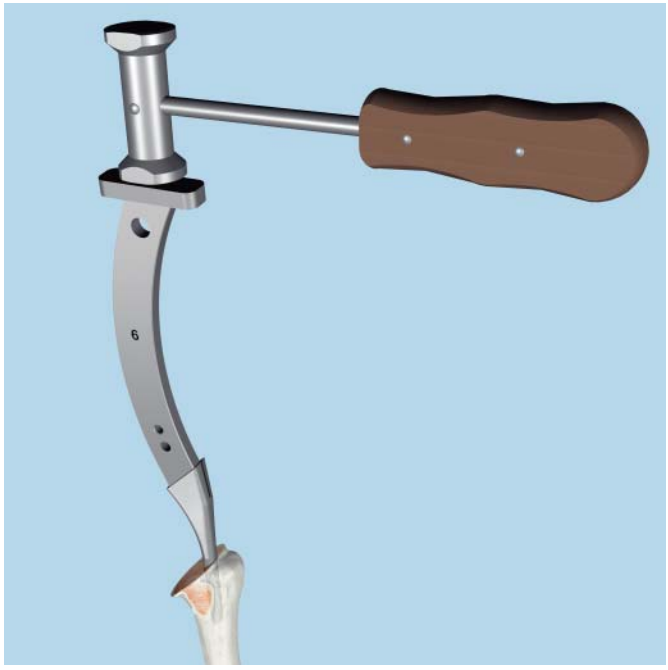
Proceed to Step 14.

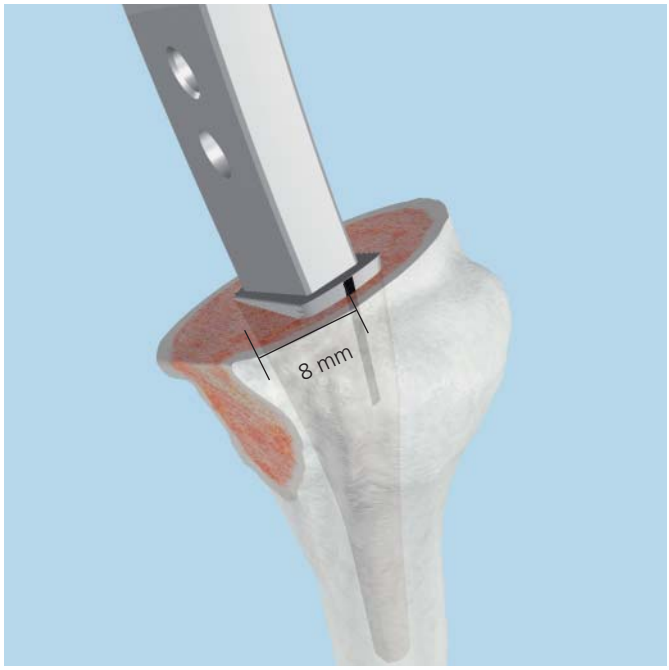
7
Determine retroversion

Instruments	
399.41	Hammer, 350 g
E5112-6– E5112-14	Rasps, sizes 6 to 14
E5115-1	6.0 mm Retrotorsion Bar
E5115-2	Goniometer

Insert the size 6 rasp into the canal. Lightly tap the top of the rasp with the hammer. The rasp is self-centering and will follow the contour of the canal. If the rasp does not advance into the medullary canal, use a curette to remove bone from the medial portion of the canal.

Use the deepest point of the bicipital groove as a landmark to determine the patient's retroversion. The mean distance between the deepest point of the bicipital groove and the center line of the rasp is 8 mm.*





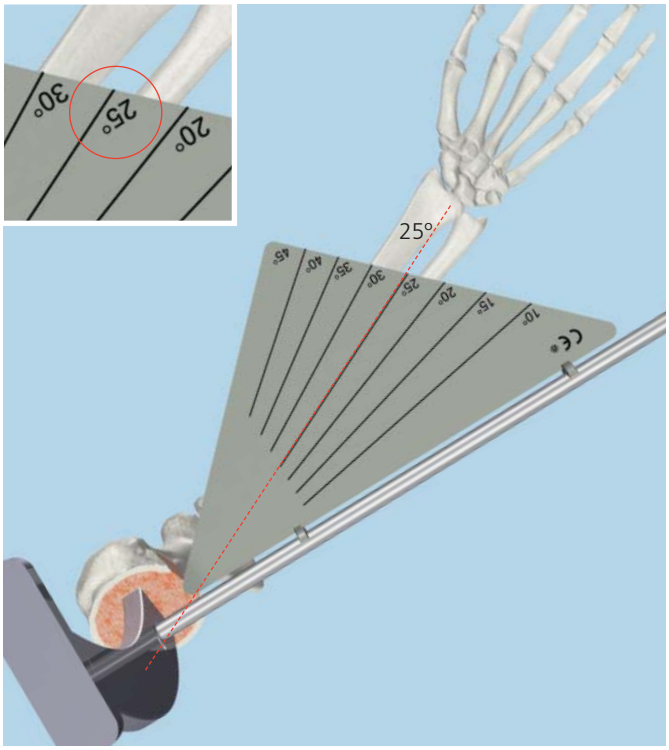
* A. Hempfing, M. Leunig, F.T. Ballmer, R. Hertel, "Surgical landmarks to determine humeral head retrotorsion for hemiarthroplasty in fractures." *Journal of Shoulder and Elbow Surgery* 10(5) (2001): 460-3.

Check the patient's retroversion by threading the 6.0 mm retrotorsion bar into the threaded hole of the rasp and place the goniometer onto the lateral side of the retrotorsion bar. Look down over the patient's shoulder and check where the line on the goniometer aligns with the forearm.

Note: If the patient's retroversion value is outside the range of 20° to 35°, recheck the distance between the center line of the rasp and the deepest point of the bicipital groove. When in doubt, use the bicipital groove as a landmark.* It provides a more accurate adjustment of retroversion than relying on the mean retroversion value.

Once the correct retrotorsion has been determined, the rasp can be driven into its final position with light hammer taps.

Note: It is important to adjust the retroversion at this stage, as it will be difficult to change once the rasp is fully inserted.



* A. Hempfing, M. Leunig, F.T. Ballmer, R. Hertel, "*Surgical landmarks to determine humeral head retrotorsion for hemiarthroplasty in fractures.*" Journal of Shoulder and Elbow Surgery 10(5) (2001): 460-3.

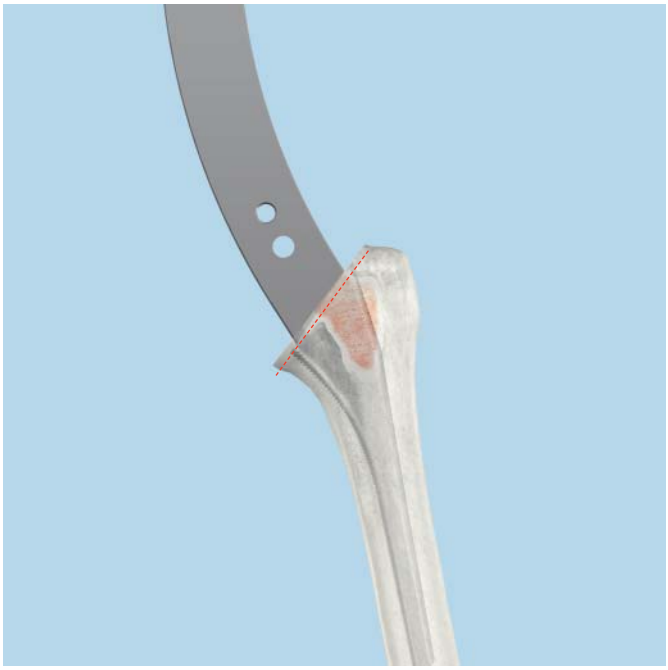
7

Determine retroversion continued

Continue rasping with incrementally larger sizes. The largest rasp that fits with its distal portion fully seated in the canal determines the final stem size for implantation.

The medial side of the rasp should sit below the initial resection line.

Remove rasp.



8

Insert trial stem

Instruments	
399.41	Hammer, 350 g
E5113-6– E5113-14	Trial Stems, sizes 6 to 14
E5115-2	Goniometer
E5115-3	Inserter/Extractor for Trial Stem

Thread the inserter/extractor into the proximal hole of the selected trial stem. Use the small retrotorsion bar to control rotation while inserting the trial implant. Apply controlled light blows with the hammer to the top of the inserter/extractor until the trial stem is fully seated in the shaft.

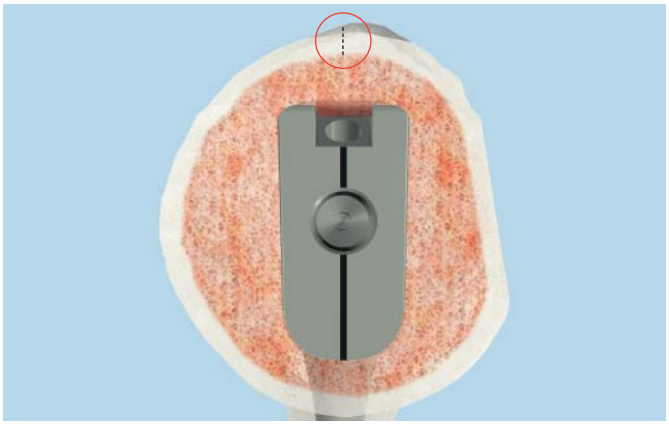
Remove the inserter/extractor.

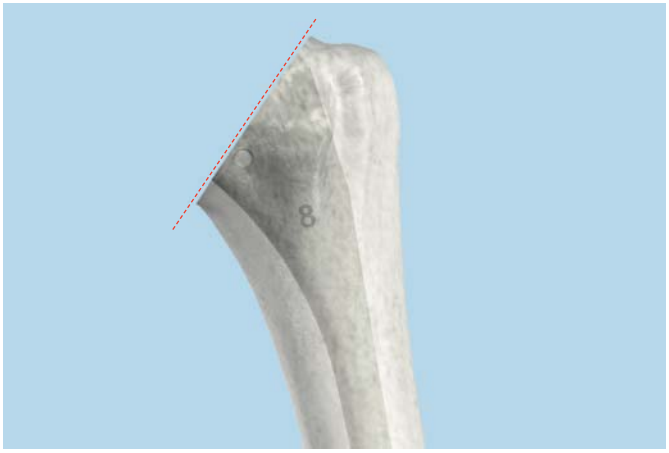
9

Perform definitive resection of humeral head

Use the proximal surface of the trial stem as a cutting guide to perform the definitive resection of the humeral head. The osteotomized surface of the proximal humerus should be flush with the surface of the trial stem, and should mimic the line of the original anatomic neck.

Technique tip: Mark tissue above the lateral edge of the humerus to identify numeric setting of the head.





10

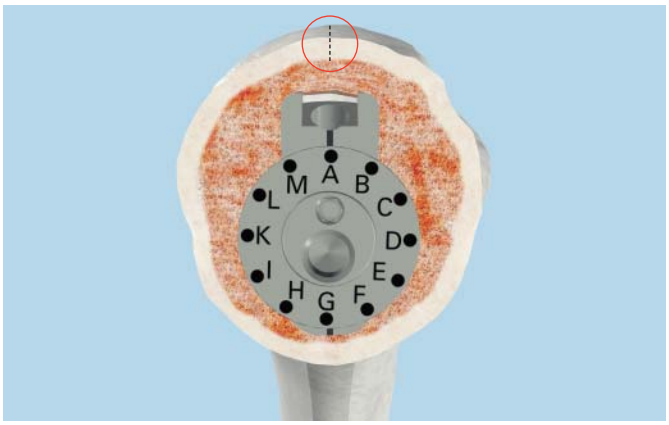
Attach trial eccenter

Instruments	
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant
E5117-20	Trial Eccenter

Attach the trial eccenter to the trial stem.

Align the letter "A" on the trial eccenter with the proximal line on the trial stem. This position reflects the median offset of a normal humerus.

Lock the trial eccenter in place using the 2.0 mm hex screwdriver in the proximal hole.



11

Introduce trial head and adjust offset

Instruments	
E5114-40– E5114-58	Trial Heads, sizes 40 to 58
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant
E5115-4/3	2.5 mm Hex Screwdriver for Trial Implant

Back out the setscrews from the trial head, using the 2.0 mm hex screwdriver, to prevent impingement on the trial eccenter.

Note: Be careful not to fully back out the setscrews, as they may fall out.

Mount the trial head on the trial eccenter. Make sure the trial head fully covers the osteotomized surface.

Note: If having problems seating the trial head, check that the osteotomy surface cut is even with the surface plane of the trial stem.

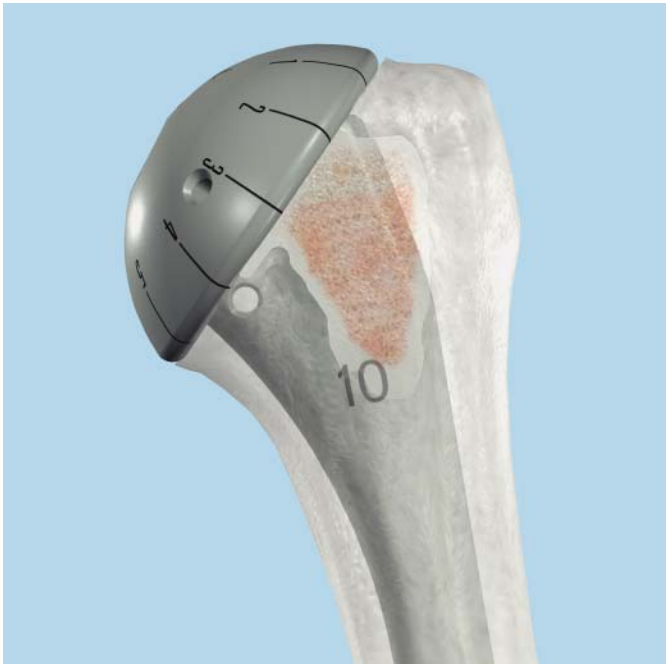
Lock the trial head in position by tightening the anterior setscrew. The trial head should fully cover the resected area. Verify that the offset is appropriate to the patient's anatomy.

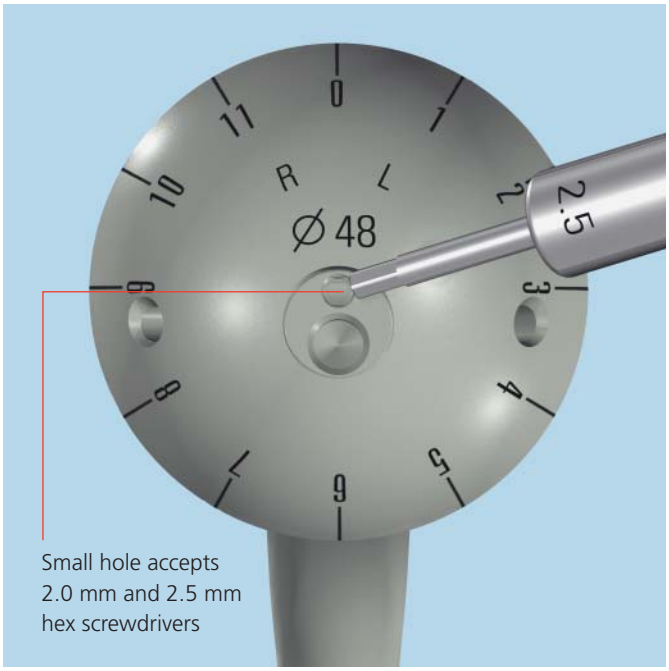
If the offset is not appropriate to the patient's anatomy, adjustments can be made by independently rotating the trial head and the eccenter relative to the humeral shaft.

Option 1

Adjust either the anteroposterior position or the mediolateral position. Loosen the trial eccenter by inserting the 2.0 mm hex screwdriver in the proximal hole of the trial head-trial eccenter assembly. Replace the 2.0 mm hex screwdriver with the 2.5 mm hex screwdriver and rotate the trial eccenter until the desired head position is achieved.

For further adjustment, loosen the anterior setscrew on the trial head with the 2.0 mm hex screwdriver and manually rotate the trial head until the desired position is achieved. Lock the position by tightening the setscrew.

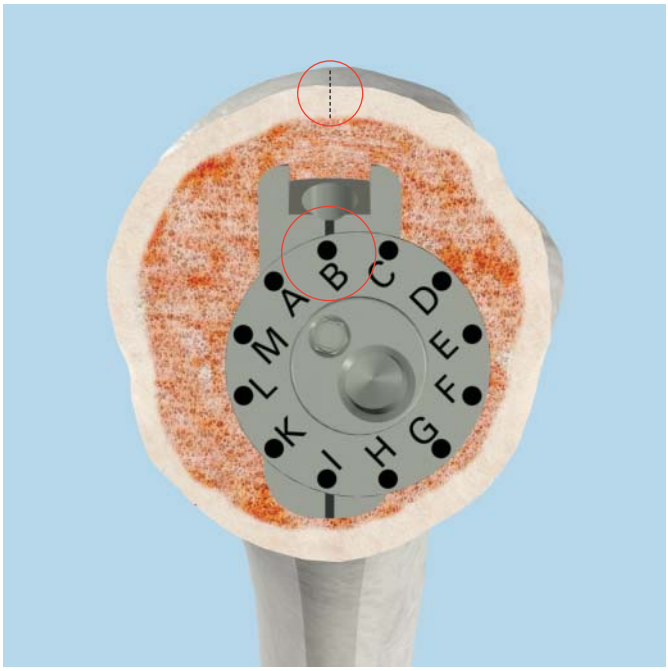




Option 2

Alternatively, the eccenter and the head can be adjusted separately. Remove the trial head by loosening the anterior setscrew with the 2.0 mm hex screwdriver and lock the eccenter in position "A". Replace the trial head and rotate the head using the 2.0 mm hex screwdriver until adequate coverage of the resected area is obtained. If adequate coverage is not obtainable, remove the head, set the eccenter to position "B", reinsert the head and rotate the head to the desired position. If an optimal position is not obtained, set the eccenter on position "C", and so forth. When the desired offset is achieved, lock the position by tightening the anterior setscrew using the 2.0 mm hex screwdriver.

Note: Use the 2.0 mm hex screwdriver to tighten and loosen the trial eccenter and the setscrews of the trial head. The 2.5 mm hex screwdriver is only used for rotating the eccenter.



12

Record offset and remove trial implants

Instruments	
399.41	Hammer, 350 g
E5115-3	Inserter/Extractor for Trial Stem
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant

Record the offset of the trial head. Remove the trial head using the 2.0 mm hex screwdriver.

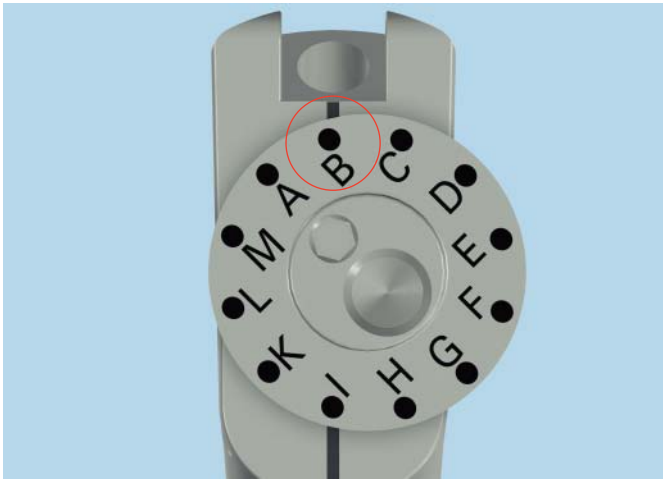
Record the offset position of the trial eccenter.

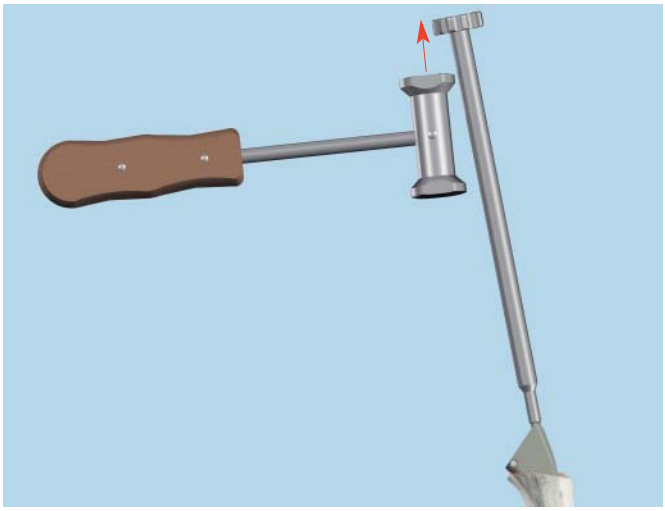
Note: It is critical to record the determined number and letter of the trial implants, as these will ultimately be transferred to the final implants.

Remove the eccenter using the 2.0 mm hex screwdriver. Thread the inserter/extractor into the proximal hole of the trial stem. Lightly tap the top of the inserter/extractor to back out the trial stem.

Note: Ensure that the inserter/extractor is fully threaded into the trial stem to avoid possible detachment during removal.

Important: If performing glenoid replacement, refer to Section II b: "Implantation of a glenoid component" (page 42). Make sure to insert the trial stem back into the shaft using the inserter/extractor, before proceeding to glenoid implantation.





13
Assemble implants

Instruments	
E5115-5/1	Press
E5115-5/3	Eccenter Impactor for Press
E5115-5/4	Torque Wrench for Press
E5115-5/6– E5115-5/14	Stem Holders for Press, sizes 6 to 14

Note: The press requires autoclavable oil prior to use.

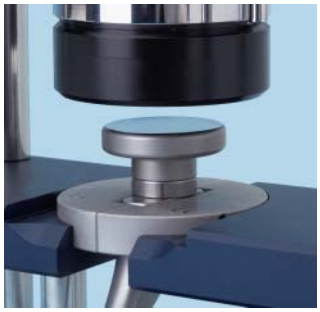
Choose the same-sized stem holder as the stem that was determined for implantation. Orient the half of the stem holder with the two pegs with the etched side facing up. With the distal end of the stem toward the operator, insert the two pegs of the stem holder through the corresponding holes of the stem. Place the other half of the stem holder on the opposite side of the assembly. This allows the stem assembly to lie stable in the press.

Important: Ensure the etched side of the stem holder is facing up. Improper assembly may cause jamming.

Position the eccenter on the stem. Align the letter recorded during the trial implantation (Step 12) with the center line of the stem.

Place the assembly in the press and position the eccenter impactor over the eccenter.

Note: Handle coated stems with care to avoid disrupting the coating.



13

Assemble implants continued

Using the torque wrench, turn the handle of the press clockwise in a controlled, slow motion. Tighten the wrench until two clicks are heard, signifying the positive engagement of the eccenter and the stem.

Turn the torque wrench counterclockwise and remove the eccenter impactor. Remove the stem-eccenter assembly from the press.

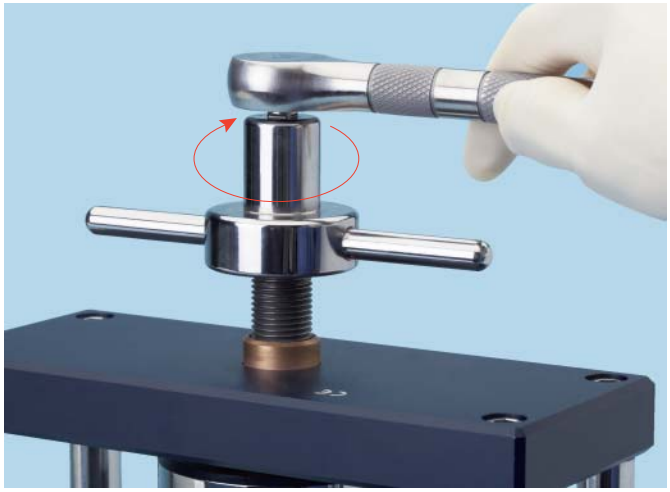
Remove half of the stem holder, leaving the other half with the pegs still engaged in the holes of the stem. Place the head on the stem assembly. Align the recorded offset position with the edge of the stem holder. Replace the other half of the stem holder. Be careful to not disrupt the head offset position.

Note: Ensure that the etched side is readable, to allow proper positioning and to prevent jamming.

Place the head and the stem assembly in the press. Compress components in the press by turning the torque wrench clockwise in a controlled, slow motion. Tighten the wrench until two clicks are heard, signifying the positive engagement of the head.

Remove the implant from the press by turning the torque wrench counterclockwise. Remove the stem holder.

Note: No visible gap should be present between the base of the head and the humeral stem.



14
Implant final assembly

Note: Choose final implantation method according to the type of stem being used.

Final implantation for cemented stems

Instruments	
399.41	Hammer, 350 g
E5115-2	Goniometer
E5115-6	3.0 mm Retrotorsion Bar
E5115-7	Head Impactor

Thread the end cap onto the head impactor.

Note: Follow the manufacturer's instruction for preparation, injection, and setting of bone cement.

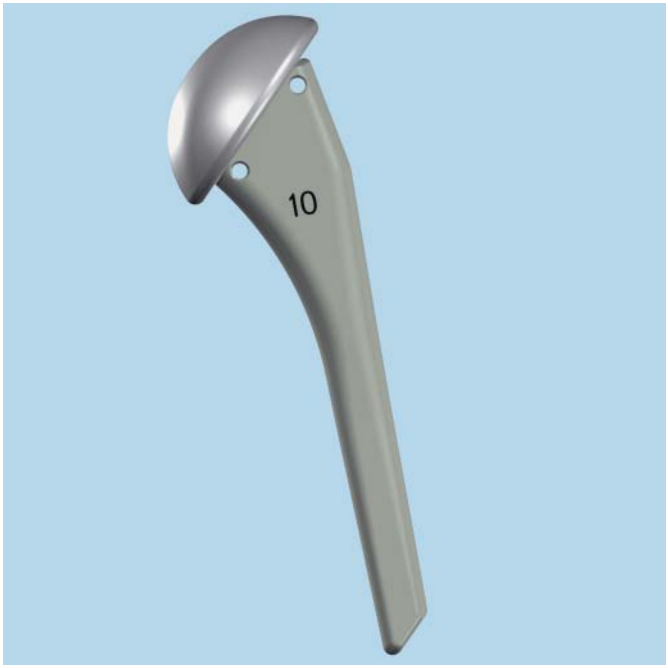
Do a final irrigation and suction of the medullary canal to remove blood and bone debris. Insert a synthetic cement restrictor into the medullary canal to prevent excess cement from flowing into the distal humerus.

Place a vent tube in the medullary canal. Dry the cavity. Inject cement into the canal. Remove the vent tube while the cement is being injected.

Ensure that the implant assembly is clean before inserting it into the medullary canal. Check the final retroversion using the 3.0 mm retrotorsion bar and the goniometer.

Tap lightly on the head with the head impactor until fully seated. Remember to ensure that the implant sits proud from the shaft at the predetermined height.

Remove any excess bone cement before it sets.



14

Implant final assembly continued

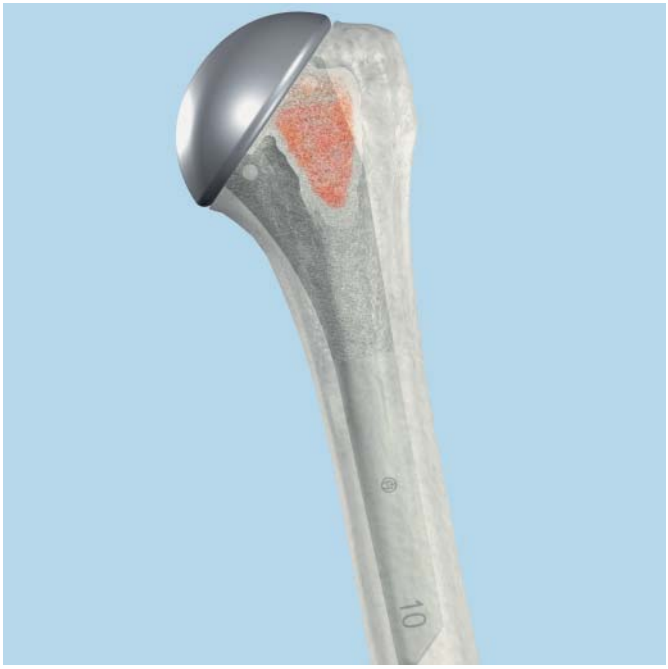
Final implantation for press-fit stems

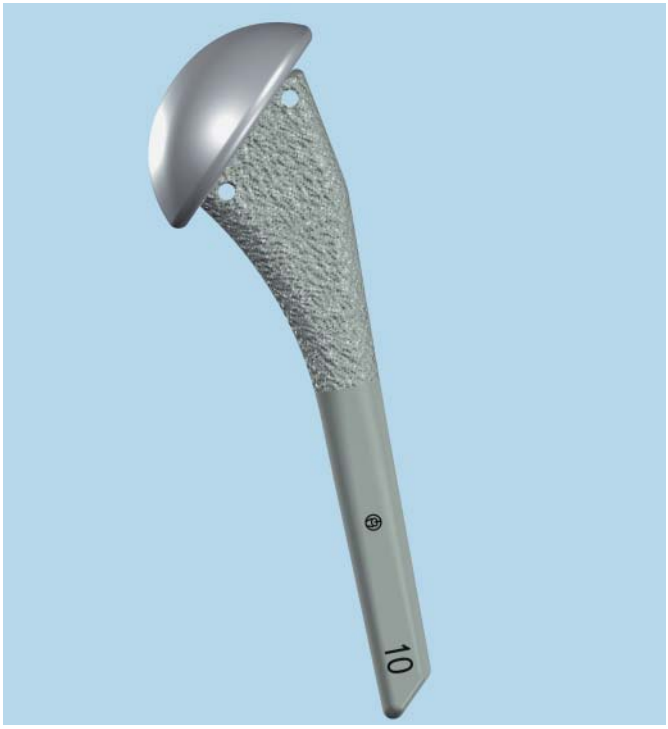
Instruments	
399.41	Hammer, 350 g
E5115-7	Head Impactor

Thread the end cap onto the head impactor.

Introduce the prosthesis assembly to the medullary canal. Ensure proper placement and orientation of the implant.

Tap lightly on the head with the head impactor until fully seated.





15

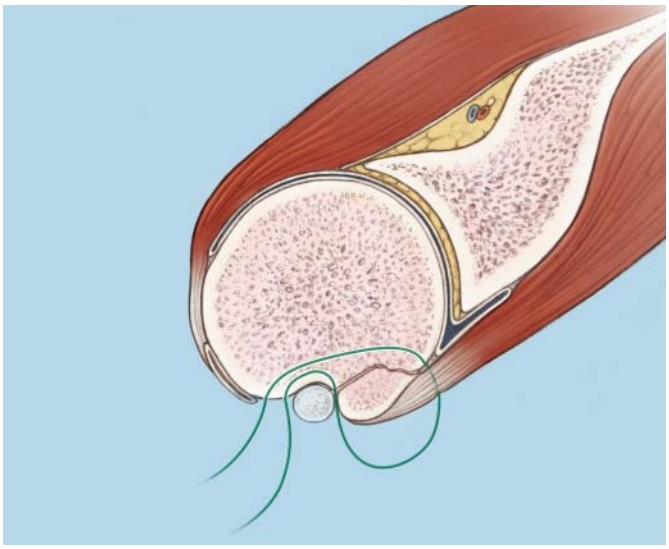
Reattach lesser tuberosity

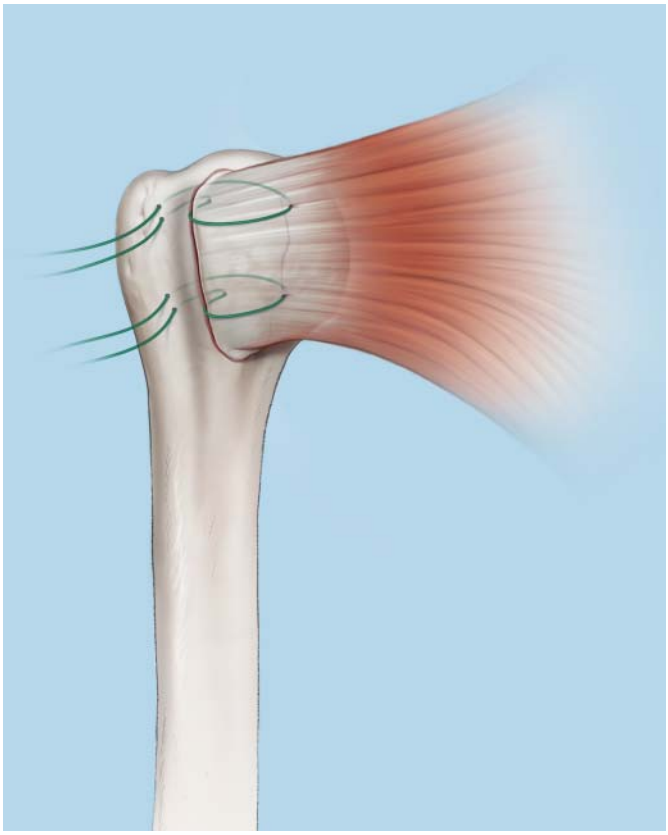
Stable reattachment of the subscapularis is essential for early rehabilitation. Avoid lateralization of the lesser tuberosity, in order to provide an adequate range of external rotation.

Pass two high-strength sutures through the subscapularis tendon close to the tendon-bone junction. Drill holes in the dense bone posterior to the bicipital groove, in order to pass the sutures. Pass the sutures through the proximal humerus using a "Donati" type stitch (pass the sutures under the bicipital groove and exit immediately posterior to the bicipital groove). This will position the lesser tuberosity snugly against the osteotomized surface. If desired, an additional 1.0 mm wire suture can be passed to enhance stability and visualization of the lesser tuberosity for later x-ray controls.

Close the lateral half of the rotator interval with non-absorbable sutures. Relocate the distal stump of the biceps tendon in the bicipital groove and suture to the soft tissues in this position.

Examine the range of motion and the stability of the joint.





Implantation of a glenoid component is performed as part of a total joint arthroplasty. Follow the steps for a standard humeral component, and when directed to do so, continue with the following procedure.

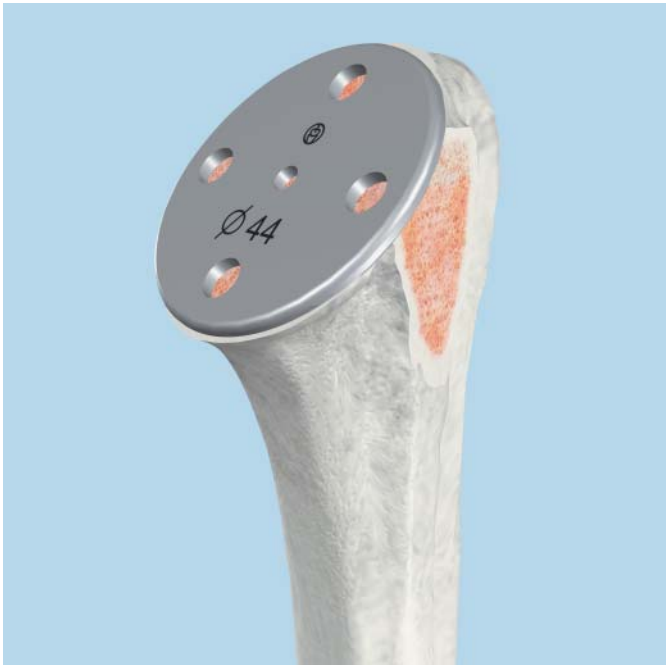
Note: The size of the glenoid implant is determined by the size of the humeral head component.

1

Approach and exposure

Instruments

E5115-4/2	2.0 mm Hex Screwdriver
E5115-8/38	38 mm Humeral Cover for Trial Stem
E5115-8/44	44 mm Humeral Cover for Trial Stem
E5115-8/48	48 mm Humeral Cover for Trial Stem



Place the protection cover on the trial stem to protect the humeral shaft from glenoid retractors and reamers during glenoid implantation. Tighten the center hole of the cover with the 2.0 mm hex screwdriver.

Note: Use a cover that fully protects the anterior rim of the humeral osteotomy area.

Adequate exposure of the glenoid is essential for adequate implantation and must allow for the use of straight instruments such as reamers and drill bits.

Release the joint capsule around the perimeter of the glenoid to allow posterior and inferior dislocation of the proximal humerus and expose the glenoid. The remnants of the labrum can be resected. The release is adequate if the muscular fibers of the rotator cuff can be visualized at the level of the glenoid rim.

Release the coracohumeral ligament and adhesions along the anterior border of the supraspinatus to provide additional exposure.

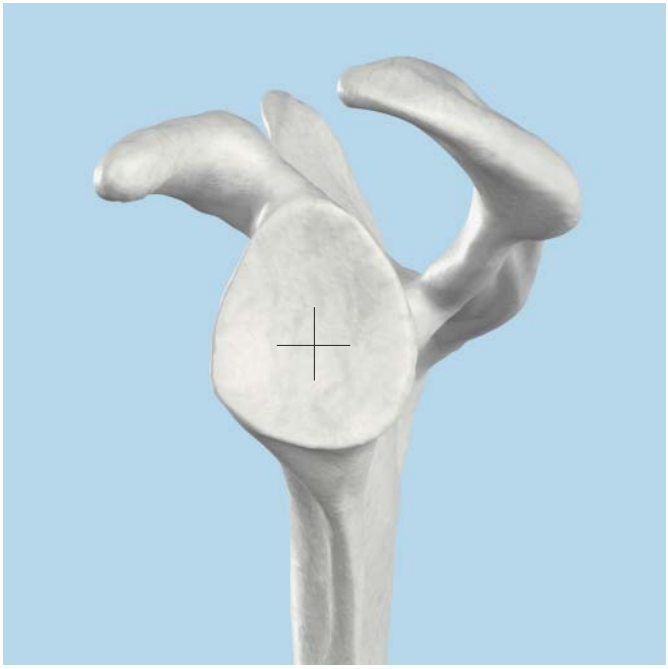
Place the arm in neutral rotation and introduce a tear-drop ring retractor (or other instrument such as a Fukuda ring retractor) to displace the proximal humerus in a posterior and inferior direction.

Remove any osteophytes that could restrict motion with a rongeur or chisel. Superior osteophytes may impede normal gliding of the rotator cuff. Anterior and inferior osteophytes may restrict internal rotation and adduction.

2

Locate center point

Locate the true center of the glenoid, which is slightly inferior to the midpoint of Saller's line (vertical line dividing the glenoid into anterior and posterior halves). This is the point of slippage of the humeral head during concentric motion.



3

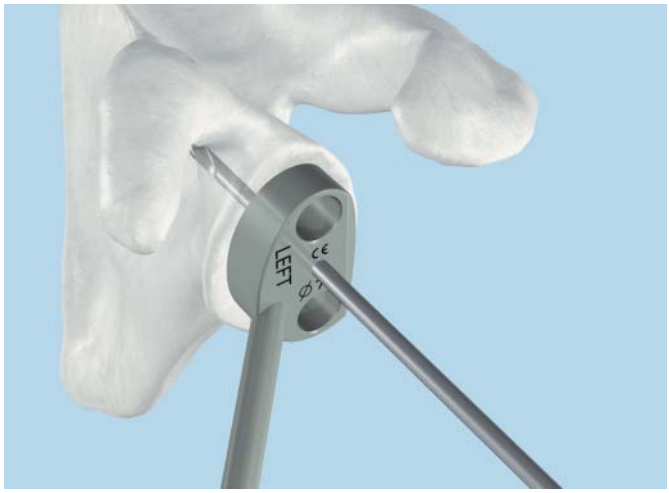
Determine correction

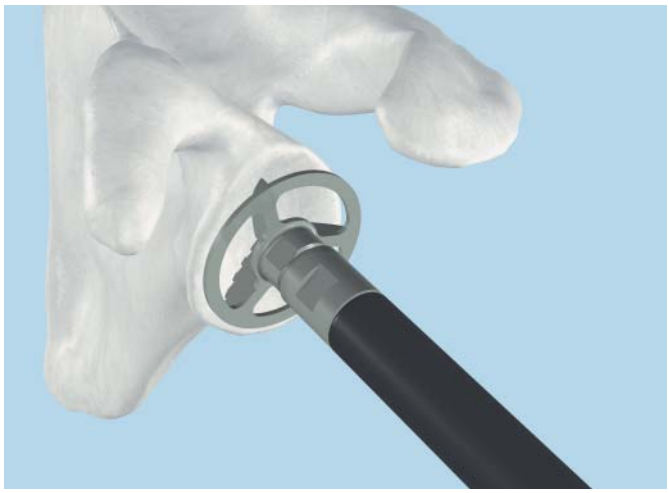
After locating the center point, determine the amount of reaming required anteriorly and inferiorly to that point.

4

Ream glenoid

Instruments	
292.75	2.5 mm Kirschner Wire
E5115-4/3	2.5 mm Hex Screwdriver
E5211-2	Rigid Guide Extension
E5211-3	10 mm Wrench (2 required)
E5211-4L	Drill Guide, left
E5211-4R	Drill Guide, right
E5211-9	Thorn for Reamer
E5211-28	28 mm Reamer for Glenoid
E5211-32	32 mm Reamer for Glenoid





The shape of the drill guide resembles the shape of the glenoid implant. Confirm the desired anatomic position of the glenoid implant by placing the drill guide (left or right) on the glenoid. The central hole of the drill guide should cover the center point located in Step 2. Introduce the 2.5 mm K-wire through this hole. Check the position and the orientation of the K-wire with respect to the planned angular correction.

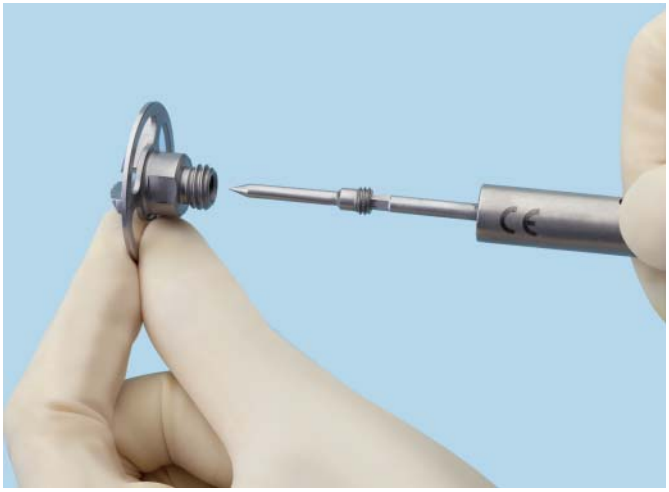
Thread the 28 mm reamer onto the assembled rigid guide extension.

Tighten the reamer and the rigid guide extension using one wrench to turn the reamer and another to turn the rigid guide extension in the opposite direction. Couple the assembly to power equipment using a Jacobs chuck.

If there is sufficient exposure, place the reamer assembly over the K-wire, position the reamer firmly against the glenoid, and ream.

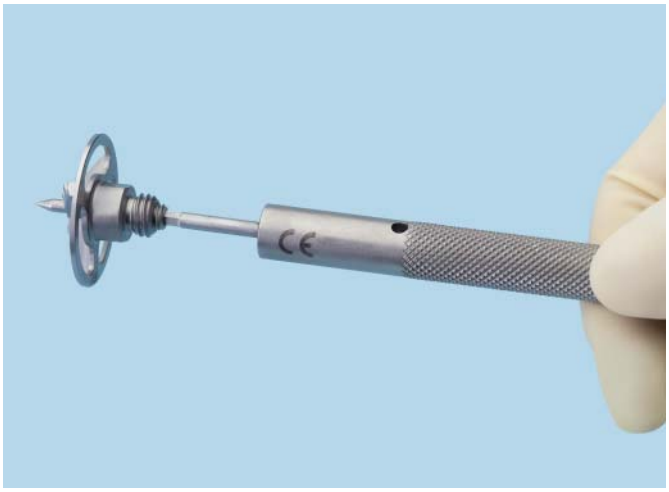
If there is insufficient exposure to slide the reamer over the K-wire, there are two options:

– Remove the K-wire, place the reamer-rigid guide extension assembly on the glenoid, then reintroduce the K-wire through the assembly into the previously drilled central hole and ream.
– Instead of using a K-wire, attach the thorn to the reamer head using the 2.5 mm hex screwdriver. Thread the reamer-thorn assembly to the rigid guide extension. Use the two wrenches to fully tighten the assembly. Couple the rigid guide extension to power equipment using a Jacobs chuck. Place the thorn in the previously prepared central glenoid hole where it will stabilize the reamer during reaming.



Ream clockwise at high speed and with steady pressure. Openings in the reamer allow visualization of the glenoid. During the reaming process, correct the retro- or anteversion while preserving as much dense subchondral bone as possible.

Note: Too much axial pressure on the reamer when reaming on weak, osteopenic bone may lead to overreaming.



For larger glenoid sizes (48 mm–58 mm), continue reaming with the 32 mm reamer to gain superior and inferior extension of the prepared surface.

5
Prepare for trial glenoid

Instruments	
E5211-2	Rigid Guide Extension
E5211-4L	Drill Guide, left
E5211-4R	Drill Guide, right
E5211-6K	7.4 mm Drill Bit, 150 mm
E5211-6L	7.4 mm Drill Bit, 200 mm

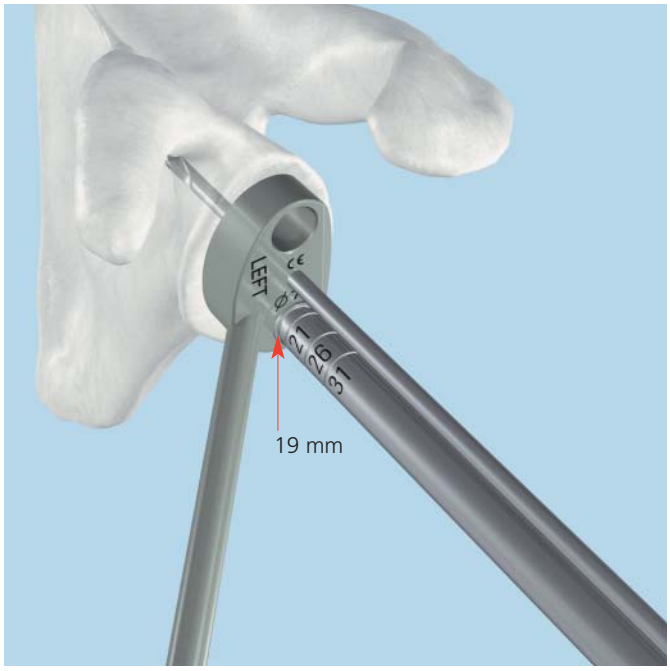
If the K-wire has been removed, reinsert it. Reintroduce the drill guide (left or right) over the K-wire. Rotate the drill guide until anatomic alignment is obtained.

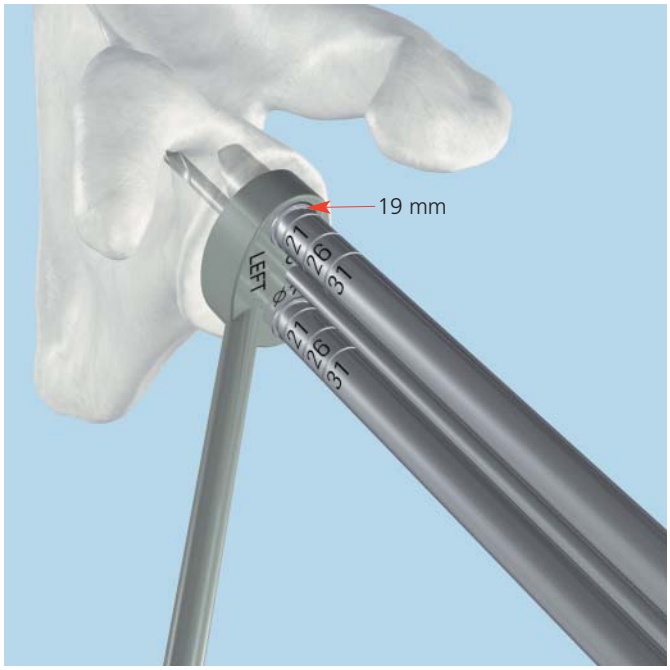
Note: Use the insertion point of the biceps tendon as a landmark to determine the alignment of the longitudinal axis of the glenoid. It is advisable to position the inferior hole slightly posterior and the superior hole slightly anterior to Saller's line.

Using the 150 mm long drill bit, drill through the distal hole of the drill guide to the first line on the drill bit (19 mm). Remove the chuck, but leave the drill bit in the drilled hole to prevent the drill guide from rotating while drilling the proximal hole.

Using the 200 mm long drill bit, drill through the proximal hole to the first line on the drill bit (19 mm).

Remove the drill bits, K-wire, and drill guide.





6
Introduce trial glenoid

Instruments	
E5211-8E	Trial Glenoid Clamp
E5213-42– E5213-54	Trial Glenoids, size 42 to 54

Select the trial glenoid that most closely matches the size of the humeral head implant selected in Section II a:

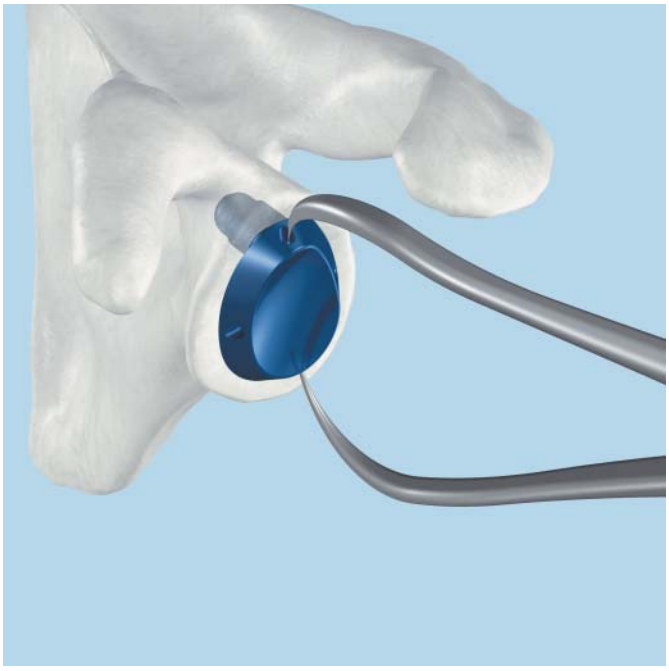
Head size	40	42	44	46	48	50	52	54
Trial size	40/42	40/42	44/46	44/46	48/50	48/50	52/54	52/54
Part number	E5213–42	E5213–42	E5213–46	E5213–46	E5213–50	E5213–50	E5213–54	E5213–54

Note: Check the marking on the back of the trial glenoid before placement to ensure that the trial size corresponds with the head size.

Use the trial glenoid clamp to place the trial glenoid against the glenoid surface.

Check the fit of the trial implant to the glenoid surface, and of the pegs in the drill holes. If there are gaps, or it does not fit properly, ream the glenoid surface again or fill in the defects with autogeneous bone graft.

After checking the glenoid implant placement, remove the trial glenoid.



7
Implant glenoid component

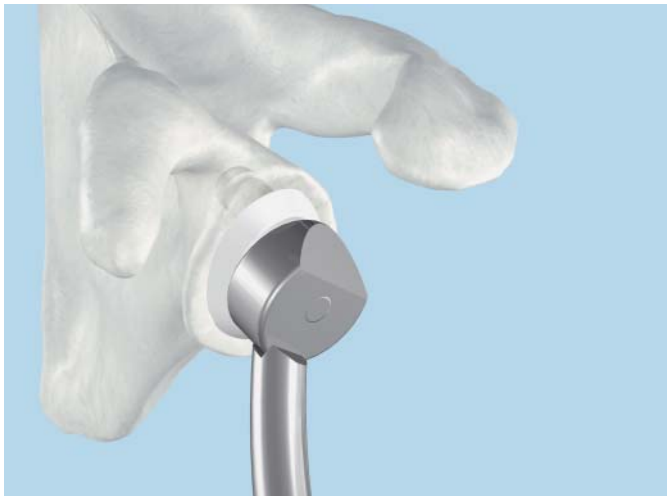
Instruments	
399.41	Hammer, 350 g
E5114-56	Trial Head, size 56
E5114-58	Trial Head, size 58
E5211-8	Glenoid Clamp
E5211-10	Glenoid Impactor

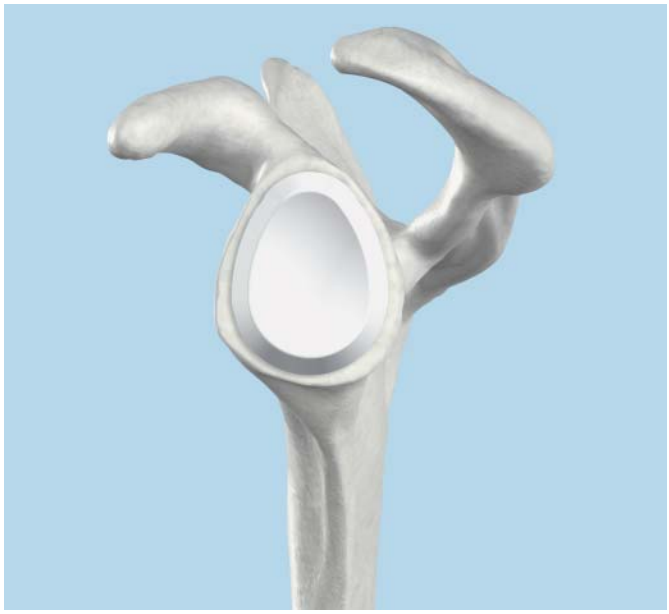
Thread the end cap into the glenoid impactor.

Introduce a small amount of bone cement (methylmethacrylate) into the two drilled cavities.

Note: Avoid overflowing the cement onto the reamed surface of the glenoid, as this will lead to a thin and brittle cement layer. Follow the manufacturer's instructions regarding the usage of bone cement.

Place the glenoid implant in position using the glenoid clamp. Impact the glenoid implant with light taps of the 350 g hammer on the glenoid impactor.





8
Complete implantation of standard humeral component

Remove the humeral retractors and expose the proximal humerus. Remove the cover for the trial stem and complete the implantation of a standard humeral component.

Postoperative Treatment

The aim of early rehabilitation is to maintain passive range of motion while the tuberosities are allowed to heal. Cable or wire refixation of the tuberosities allows a certain level of an unconstrained rehabilitation program.

The arm should be held stable with a simple sling during the daytime and in a more formal gilet at night. Passive rehabilitation can be started the day after surgery. Follow-up is recommended at 3 weeks, 6 weeks, 12 weeks, 1 year and biennially thereafter.

The patient should start with gentle pendulum exercises. For the first six weeks, prescribed exercises must consider the following limitations:

– Internal rotation: to the stomach
– External rotation: up to 10° less than the contralateral side
– Elevation: hand to the top of the head

Physical therapist recommended exercises should be performed by the patient, using the contralateral side to move the affected arm. The program should be tailored to the capability and the compliability of the patient.

At week 7, the patient may begin strengthening exercises three times a day for 6–8 months.

A patient instruction card with information on the implant and advice on antibiotic prophylaxis in case of infections and/or surgical interventions is recommended.

Implants

CoCr Heads, sterile

– Cobalt chromium alloy (Co-28Cr-6Mo)

	Diameter (mm)	Height (mm)
5331-40/15	40	15.00
5331-42/15	42	15.75
5331-44/16	44	16.50
5331-46/17	46	17.25
5331-48/18	48	18.00
5331-50/18	50	18.75
5331-52/19	52	19.50
5331-54/20	54	20.25
5331-56/21	56	21.00
5331-58/22	58	21.75

Glenoids, sterile

– UHMW polyethylene

– Congruent to head diameter

	Head Diameter (mm)
5213-42	40/42
5213-44	44
5213-46	46
5213-48	48
5213-50	50
5213-52	52
5213-54	54
5213-56	56
5213-58	58

Titanium Eccenter, sterile

– Titanium alloy (Ti-6Al-7Nb)

– Patented eccenter design

	Usage
5413-20/5	Standard

Note: Implants ordered separately.

Titanium Humeral Stems, press-fit, sterile

– Titanium alloy (Ti-6Al-7Nb) with titanium plasma coating
– Anatomic design

	Size	Length (mm)
5537-6/11	6	115
5537-8/12	8	120
5537-10/12	10	125
5537-12/13	12	130
5537-14/13	14	135

Titanium Humeral Stems, press-fit, sterile

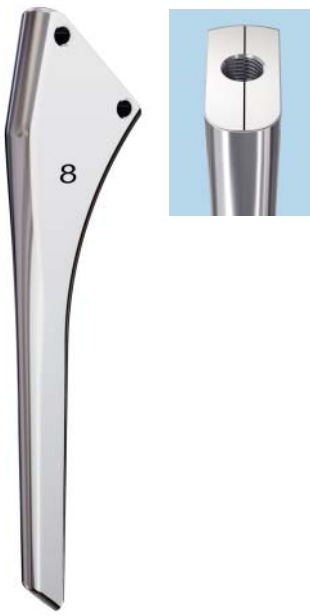
– Titanium alloy (Ti-6Al-7Nb) with titanium plasma spray and hydroxyapatite coating
– Anatomic design

	Size	Length (mm)
5540-6/11	6	115
5540-8/12	8	120
5540-10/12	10	125
5540-12/13	12	130
5540-14/13	14	135

CoCr Humeral Stems, cemented, sterile

– Cobalt chromium alloy (Co-28Cr-6Mo)
– Anatomic design

	Size	Length (mm)
5624-6/11	6	115
5624-8/12	8	120
5624-10/12	10	125
5624-12/13	12	130
5624-14/13	14	135



Note: Implants ordered separately.

CoCR Long Humeral Stems, cemented, sterile

– Cobalt chromium alloy (Co-28Cr-6Mo)

– Anatomic design

	Size	Length (mm)
5624-6/15L	6	155
5624-8/16L	8	160
5624-10/16L	10	165
5624-12/17L	12	170
5624-14/17L	14	175

CoCR Extra-Long Humeral Stems, cemented, sterile

– Cobalt chromium alloy (Co-28Cr-6Mo)

– Anatomic design

	Size	Length (mm)
5624-6/19XL	6	195
5624-8/20XL	8	200
5624-10/20XL	10	205
5624-12/21XL	12	210
5624-14/21XL	14	215

Note: Implants ordered separately.

Instruments

E5112-1	Cylindrical Rasp

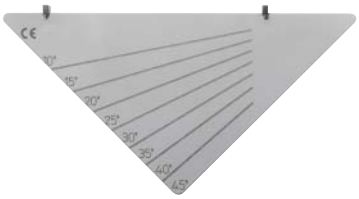
	Rasps
E5112-6	size 6
E5112-8	size 8
E5112-10	size 10
E5112-12	size 12
E5112-14	size 14

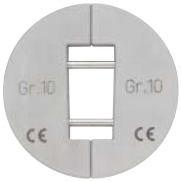
	Trial Stems
E5113-6	size 6
E5113-8	size 8
E5113-10	size 10
E5113-12	size 12
E5113-14	size 14

	Trial Heads
E5114-40	size 40
E5114-42	size 42
E5114-44	size 44
E5114-46	size 46
E5114-48	size 48
E5114-50	size 50
E5114-52	size 52
E5114-54	size 54
E5114-56*	size 56
E5114-58*	size 58

* Also available

Instruments continued

E5115-1	6.0 mm Retrotorsion Bar	
E5115-2	Goniometer	
E5115-3	Inserter/Extractor for Trial Stem	
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implant	
E5115-4/3	2.5 mm Hex Screwdriver for Trial Implant	
E5115-5/1	Press	
E5115-5/3	Eccenter Impactor for Press	

E5115-5/4	Torque Wrench for Press	
	Stem Holders, for Press	
E5115-5/6	for size 6	
E5115-5/8	for size 8	
E5115-5/10	for size 10	
E5115-5/12	for size 12	
E5115-5/14	for size 14	
E5115-6	3.0 mm Retrotorsion Bar	
E5115-7	Head Impactor	
	Humeral Covers for Trial Stem	
E5115-8/38	38 mm	
E5115-8/44	44 mm	
E5115-8/48	48 mm	
E5117-20	Trial Eccenter	
E5211-2	Rigid Guide Extension	

E5211-3	10 mm Wrench	
E5211-4L	Drill Guide, left	
E5211-4R	Drill Guide, right	
	7.4 mm Drill Bits	
E5211-6K	150 mm	
E5211-6L	200 mm	
E5211-8	Glenoid Clamp	
E5211-8E	Trial Glenoid Clamp	

E5211-9	Thorn for Reamer	
E5211-10	Glenoid Impactor	
	Reamers for Glenoid	
E5211-28	28 mm	
E5211-32	32 mm	
	Trial Glenoids	
E5213-42	size 42	
E5213-46	size 46	
E5213-50	size 50	
E5213-54	size 54	
292.75	2.5 mm Kirschner Wire with Thread, trocar point, 150 mm	
359.221*	Combined Hammer	
399.41	Hammer, 350 grams	

* Also available

Epoca Shoulder Prosthesis Press Instrument Set (01.401.001)

Graphic Case

60.401.001	Graphic Case for Epoca Press

Instruments

E5115-5/1	Press
E5115-5/3	Eccenter Impactor for Press
E5115-5/4	Torque Wrench for Press
	Stem Holders, for Press
E5115-5/6	size 6
E5115-5/8	size 8
E5115-5/10	size 10
E5115-5/12	size 12
E5115-5/14	size 14

Note: For additional information, please refer to package insert.

Epoca Shoulder Prosthesis Rasps Instrument Set (01.401.002)

Graphic Case

60.401.002	Graphic Case for Epoca Rasps

Instruments

E5112-1	Cylindrical Rasp
E5115-1	6.0 mm Retrotorsion Bar
E5115-6	3.0 mm Retrotorsion Bar
	Rasps
E5112-6	size 6
E5112-8	size 8
E5112-10	size 10
E5112-12	size 12
E5112-14	size 14
E5115-2	Goniometer

Epoca Shoulder Prosthesis Trial Implants Instrument Set (01.401.003)

Graphic Case

60.401.003	Graphic Case for Epoca Trial Implants

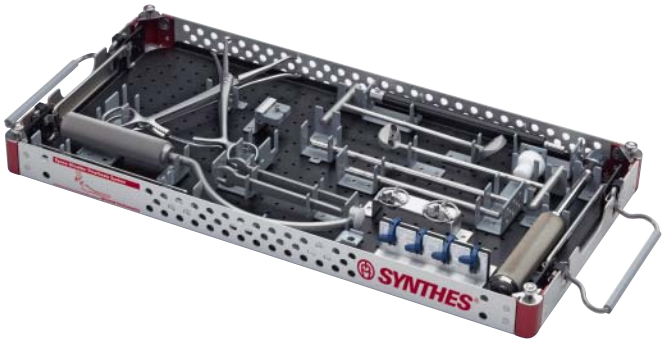
Instruments

	Trial Stems
E5113-6	size 6
E5113-8	size 8
E5113-10	size 10
E5113-12	size 12
E5113-14	size 14
	Trial Heads
E5114-40	size 40
E5114-42	size 42
E5114-44	size 44
E5114-46	size 46
E5114-48	size 48
E5114-50	size 50
E5114-52	size 52
E5114-54	size 54
E5115-3	Inserter/Extractor for Trial Stem
E5115-4/2	2.0 mm Hex Screwdriver for Trial Implants
E5115-4/3	2.5 mm Hex Screwdriver for Trial Implants
	Humeral Covers for Trial Stem
E5115-8/38	38 mm
E5115-8/44	44 mm
E5115-8/48	48 mm
E5117-20	Trial Eccenter
399.41	Hammer, 350 g

Epoca Shoulder Prosthesis Glenoid Instrument Set (01.401.004)

Graphic Case

60.401.004	Graphic Case for Epoca Glenoid Instruments



Instruments

E5115-7	Head Impactor
E5211-2	Rigid Guide Extension
E5211-3	10 mm Wrench, 2 ea.
E5211-4L	Drill Guide, left
E5211-4R	Drill Guide, right
E5211-6K	7.4 mm Drill Bit, 150 mm
E5211-6L	7.4 mm Drill Bit, 200 mm
E5211-8	Glenoid Clamp
E5211-8E	Trial Glenoid Clamp
E5211-9	Thorn for Reamer
E5211-10	Glenoid Impactor
E5211-28	28 mm Reamer for Glenoid
E5211-32	32 mm Reamer for Glenoid
	Trial Glenoids
E5213-42	size 42
E5213-46	size 46
E5213-50	size 50
E5213-54	size 54
292.75	2.5 mm Kirschner Wire with Thread, 150 mm, with trocar point, 10/pkg.

Also Available

Sets

01.401.006	Epoca Shoulder Prosthesis Instrument Set consists of sets 01.401.001, 01.401.002, 01.401.003 and 01.401.004
105.924	Orthopaedic Cable System Instrument Set

Instruments

E5114-1	Set Screw for Trial Head
	Trial Heads
E5114-56	size 56
E5114-58	size 58
E5115-7P	Plastic Tip for Head Impactor
E5211-10P	Plastic Tip for Glenoid Impactor
359.221	Combined Hammer

Power Equipment

519.97	Autoclavable Oil
532.003	Small Battery Drive 12 V Battery
532.010	Small Battery Drive
532.014	Large Jacobs Chuck with key
532.021	Sagittal Saw Attachment
532.022	Quick Coupling for K-wires

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