EXACTECH | **EXTREMITIES**

Operative Technique

equinoxe®

Platform
Shoulder System

Exactech® *Surgeon focused. Patient driven.™*

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INTRODUCTION

Reverse total shoulder arthroplasty is indicated for Cuff Tear Arthropathy, massive RTC tears, superior migrated humeral head and arthritic eroded or collapsed glenohumeral joint, failed or unstable TSA, and failed rotator cuff surgery. The Equinoxe® Reverse Shoulder system is designed to address these indications while minimizing reported complications associated with rTSA; the design rationale behind this system has been proven to minimize both scapular notching and torque on the glenoid. The platform nature of the Equinoxe stem allows the surgeon to have intra-operative flexibility to choose between a hemi CTA arthroplasty or reverse total shoulder and seamlessly convert to a reverse should a revision become necessary.

Thank you for considering the Equinoxe Reverse Shoulder System. We began the Equinoxe product development process by identifying concerns our team had with shoulder replacement, including the well-documented challenges and complications surgeons have experienced with reverse shoulders. Our goal was to develop solutions to those concerns, and we believe the Equinoxe System significantly improves the surgeon's ability to precisely replicate the patient's anatomy. In general, we sought the following improvements:

Minimize Scapular Notching. The reverse lateralizes the humerus by using larger glenospheres and decreasing the humeral neck angle. The innovative glenoid baseplate design has a built-in offset that distally shifts the glenosphere to a position that prevents humeral liner impingement on the inferior glenoid.[1,2]

Enhance Glenoid Fixation. The press-fit bone cage is designed to provide strong initial fixation, while the baseplate provides up to 30 degrees of angular variability to ensure optimal compression screw placement and purchase—even in poor quality bone.[3]

Revision Friendly. The six screw holes provide optimal screw fixation, even when revising a pegged or keeled glenoid to a reverse shoulder. A wide range of augmented glenoid baseplates are available to address various types of glenoid wear.

Bone Conservation. The humeral reverse components do not require reaming of the proximal humerus, so the size of the glenosphere is no longer limited by the corresponding humeral cup size that will fit in the proximal humerus.

We hope that you come to agree, based on your experiences with the Equinoxe Shoulder System in the O.R., that we have accomplished our goal.

Finally, while we have taken a comprehensive approach to this operative technique, we would be remiss if we failed to make it clear that shoulder replacements are challenging procedures and should be performed by surgeons with significant experience. If you are new to reverse shoulders, please consider observing a shoulder specialist, watching a shoulder surgical DVD, performing a sawbone and/or implanting in a cadaver to ensure you are comfortable with the surgical technique. We would be happy to facilitate any aspect of this training to ensure success in the O.R. for the surgeon and the staff.

Respectfully,

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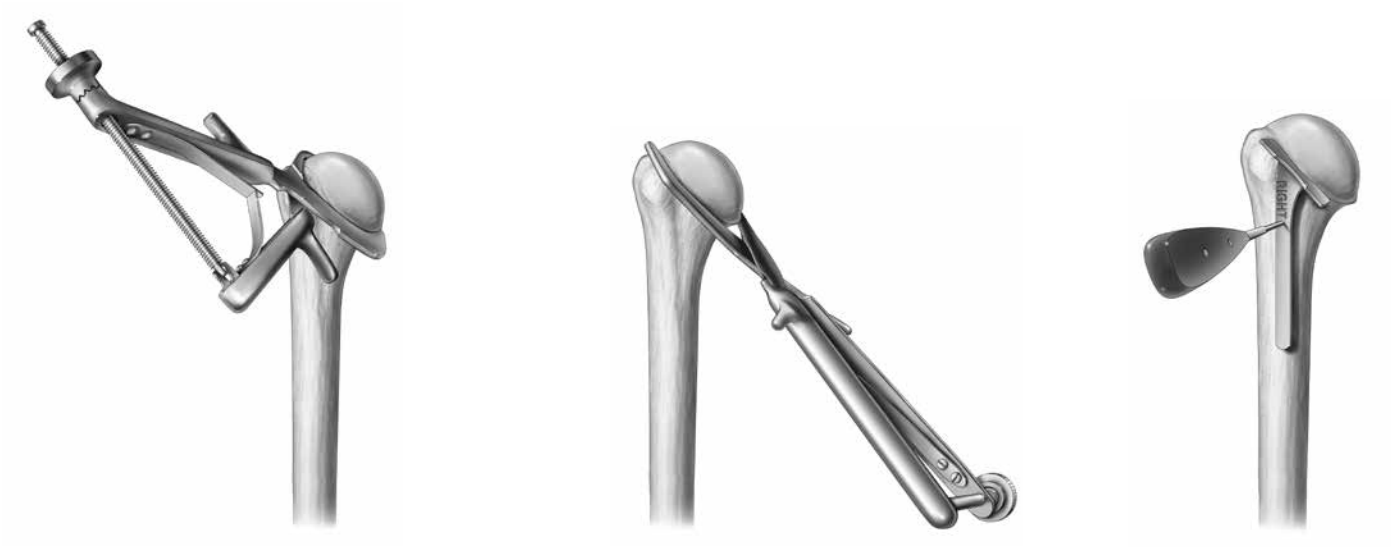

Figure A
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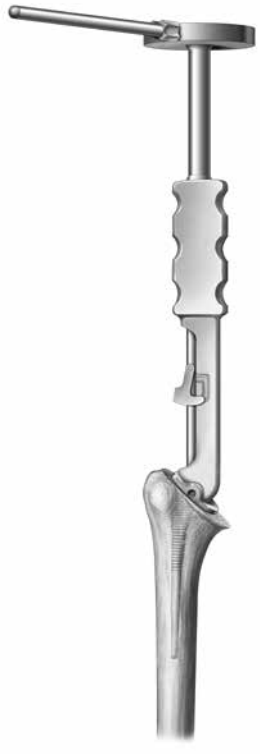

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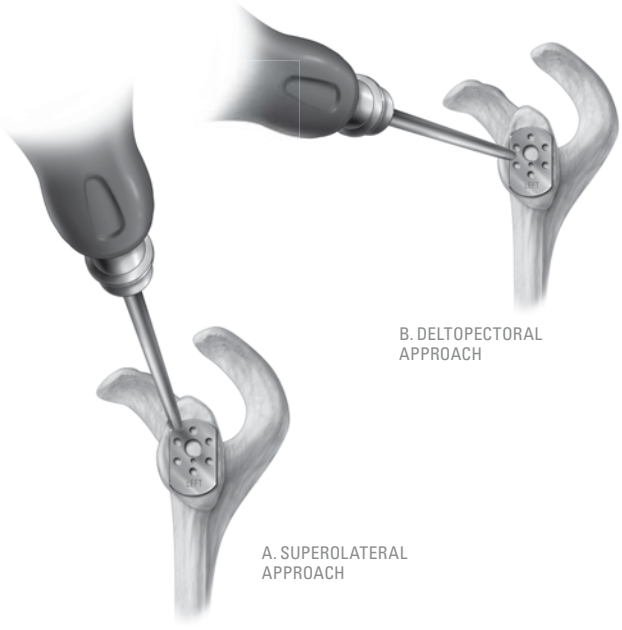

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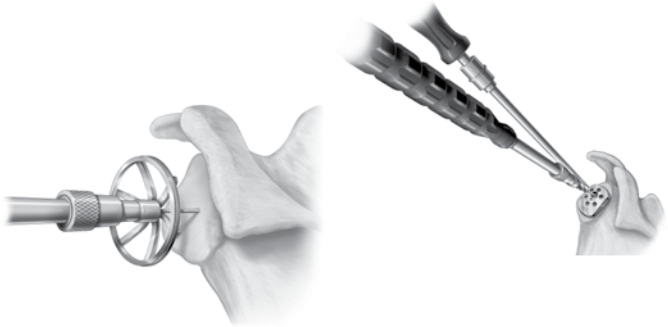

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Cannulated Option: Insert K-wire, Ream the Glenoid and Drill Glenoid Plate Hole over K-wire

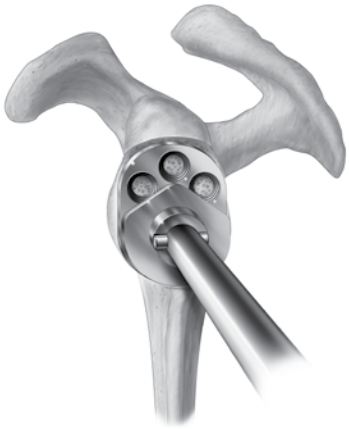

Figure I
Insert Glenoid Plate

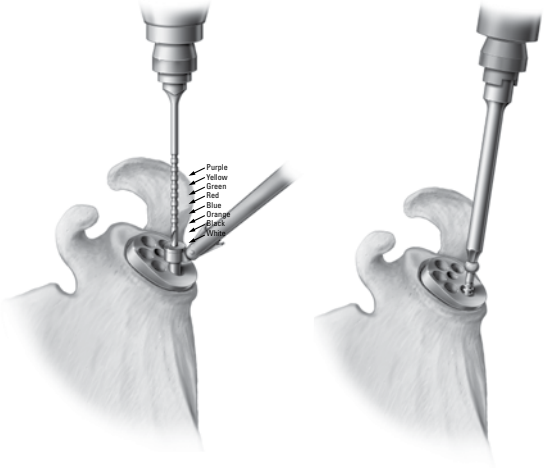

Figure J
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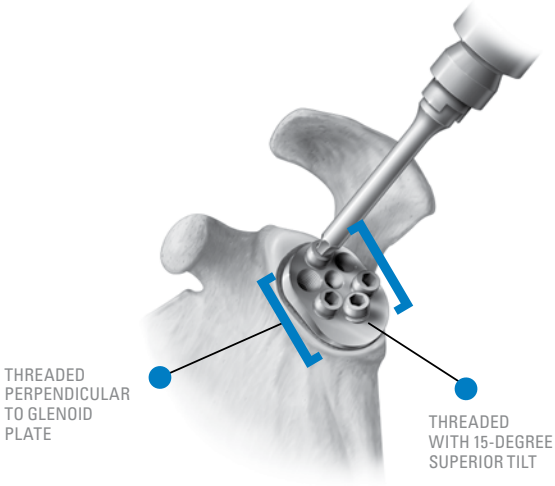

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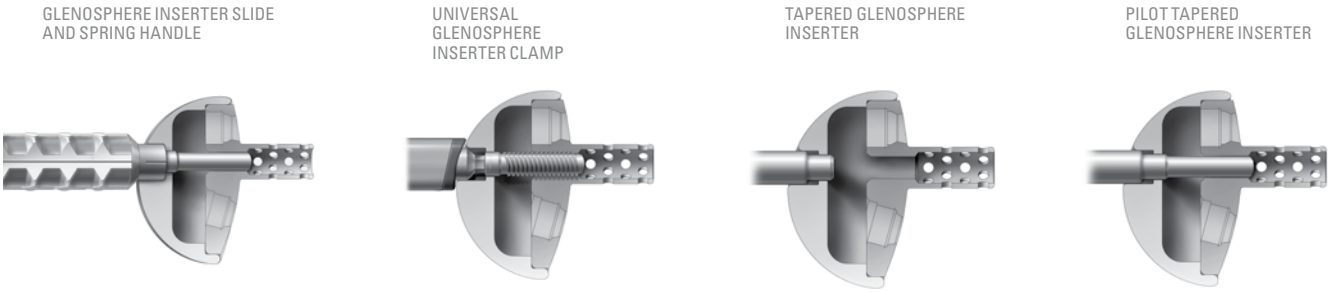

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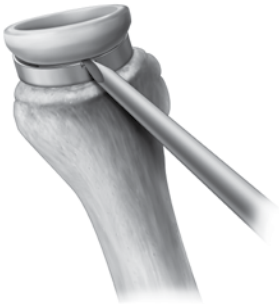

Figure N
Remove Liner Trial

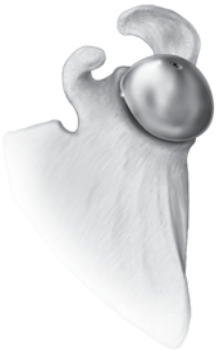

Figure O
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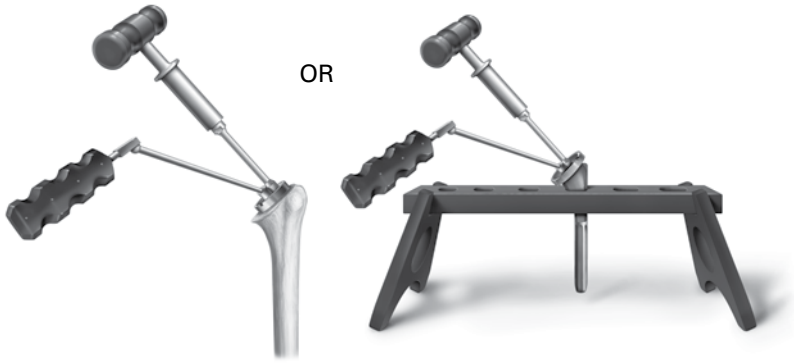

Figure Q
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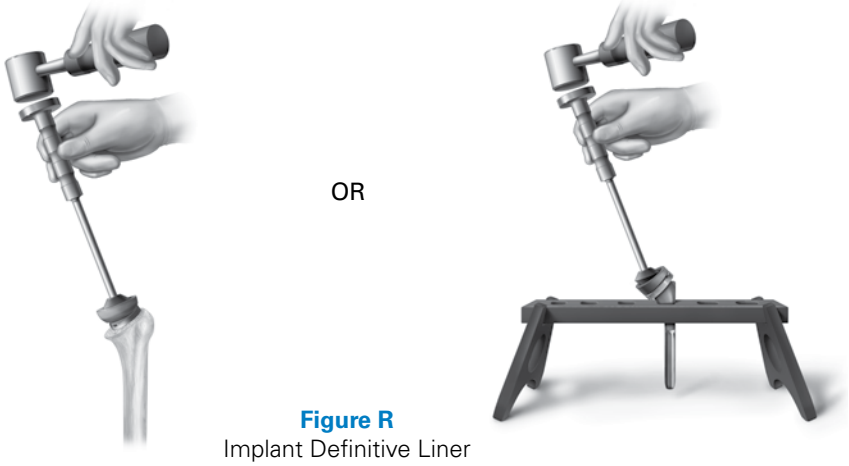


Figure R
Implant Definitive Liner

DETAILED OPERATIVE TECHNIQUE

REVERSE SHOULDER

After a careful history and physical examination, radiographs should be obtained to assess glenohumeral joint space narrowing, osseous deformities and glenoid wear. A CT scan is helpful to assist in the evaluation of the quality of bone stock and to further evaluate bone deformities that may be present. An MRI may be obtained if further evaluation of the soft tissues is determined to be helpful. To aid in pre-operative planning, radiographic templates are provided for the humeral components and glenoid components to approximate the required size and alignment of the implants.

STEP 1: PATIENT POSITIONING

The patient should be placed on an operating table in a supine position. The head of the operating table should be elevated approximately 30 degrees in a modified beach chair position. A small bolster should be placed laterally behind the involved shoulder. The patient should be moved to the side of the table so that the upper extremity can be placed in maximum extension without obstruction by the operating table. Alternatively, a Captain's chair or similar positioning device can be used for proper patient positioning. The patient should be secured to the operating table to minimize any changes in position intra-operatively. The entire upper extremity should be prepped and draped to allow complete access to the operative area and full mobility during the procedure. Either a deltopectoral or a superolateral approach may be used depending on the surgeon's preference and clinical parameters.

STEP 2: SURGICAL APPROACH

Deltopectoral Approach

An anterior deltopectoral incision is made beginning inferior to the lateral clavicle, passing over the coracoid process and extending distally toward the deltoid insertion. Medial and lateral subcutaneous flaps are created, and the deltopectoral interval is identified.

A thin fat stripe is often located over the cephalic vein. The interval is usually developed medial to the cephalic vein; the interval can also be developed laterally depending on the surgeon's preference. Branches of the cephalic vein on the approach side are cauterized, and the interval is developed inferior to superior to expose the clavipectoral fascia.

The advantage of retracting the cephalic vein with the deltoid is that the majority of the branches enter from the deltoid. The disadvantage is the vein is more exposed to injury from the retractor as it crosses the superior aspect of the interval. The subdeltoid space is mobilized with a blunt elevator. The clavipectoral fascia is incised longitudinally up to the coracoacromial ligament (which is spared), and the conjoined tendon is mobilized. A self-retaining retractor is placed with care to avoid excessive traction on the conjoined tendon. The coracoacromial ligament is identified and the subacromial space is mobilized with a blunt elevator. The subscapularis tendon insertion (if present) on the lesser tuberosity is identified along with the rotator interval. The anterior humeral circumflex vessels along the inferior border of the subscapularis muscle (the "three sisters") are cauterized extensively. The axillary nerve should be palpated in its position at the inferomedial border of the subscapularis. Exposure of the nerve for direct visualization can be performed at this point based upon surgeon preference. The biceps tendon (if present) is palpated in its groove. A biceps tenodesis can be performed at this point by dividing the tendon in the mid-portion of the groove and securing it either to the adjacent soft tissues or to bone based upon surgeon preference. The subscapularis tendon and the capsule are tenotomized 1cm medial to the lesser tuberosity and tagged with #1 sutures. The inferior capsule should be released from the humeral neck to allow the humerus to be externally rotated 90 degrees. As this release is performed, the axillary nerve should be protected by placing a blunt elevator between it and the inferior capsule.

An alternative approach is to elevate the subscapularis directly off the bone or elevate its insertion with a thin wafer of bone (1-2mm thick) using an osteotome. The choice of subscapularis detachment and subsequent reattachment is based primarily on surgeon preference. In some cases, particularly with revision surgery, the subscapularis may be absent or only the inferior portion may remain.

Exposure of the subacromial space will reveal a massive rotator cuff defect. Often there is an extensive amount of fibrous and bursal tissue filling this area that should be excised. The humerus can then be placed in extension, adduction and external rotation to begin preparation of the humerus. The large deltoid retractor should be used to enhance exposure of the proximal humerus.

Superolateral Approach

A superolateral incision is made beginning at the anterior edge of the acromion and directed posterolaterally in an oblique direction. Subcutaneous dissection is performed to raise generous flaps medially and laterally. The interval between the anterior and middle portions of the deltoid is identified and this interval is developed superiorly over the top of the acromion. In doing so, the anterior deltoid is detached from its acromial attachment along with the coracoacromial ligament insertion. The interval is developed up to 4cm distally from the acromion to avoid potential injury to the axillary nerve. This provides exposure of the subacromial space, which is usually filled with fibrous and bursal tissue that should be removed to expose the humeral head. Any remaining intact rotator cuff should be visualized and usually includes a portion of the subscapularis and teres minor, although one or both may be absent.

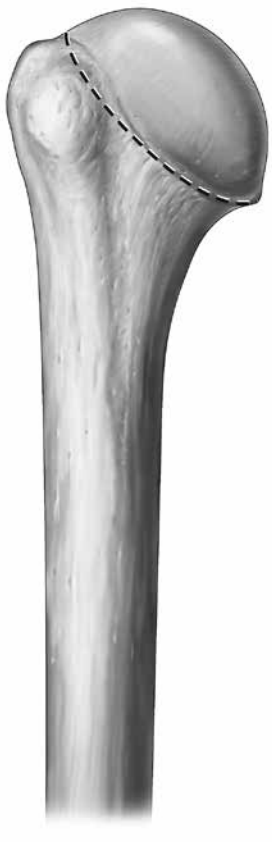


Figure 1
Humerus

The humerus should be placed in extension, adduction and external rotation along with superior displacement to dislocate the humeral head anterosuperiorly for exposure. Once again, the large Deltoid Retractor can be used to enhance visualization and exposure of the proximal humerus.

STEP 3: HUMERAL PREPARATION

Humeral Head Resection

Prior to humeral head resection, all osteophytes should be removed using a Rongeur *(Figure 1)*. Doing so will properly allow identification and exposure of the anatomic humeral neck. An aggressive resection at, or just distal to, the anatomic neck is recommended. Care should be taken not to make a resection with more than 20 degrees of retroversion as this will limit internal rotation.

Anatomic Cutting Guide: The Equinoxe

Anatomic Cutting Guide enables the surgeon to accurately resect the humeral head along, or just distal to, the anatomic neck without the use of intra- or extra-medullary alignment guides or cutting guides. The jaws of the cutting guide should be placed at, or just distal to, the anatomic neck and used as a cutting surface for the resection.

DETAILED OPERATIVE TECHNIQUE

HUMERAL PREPARATION

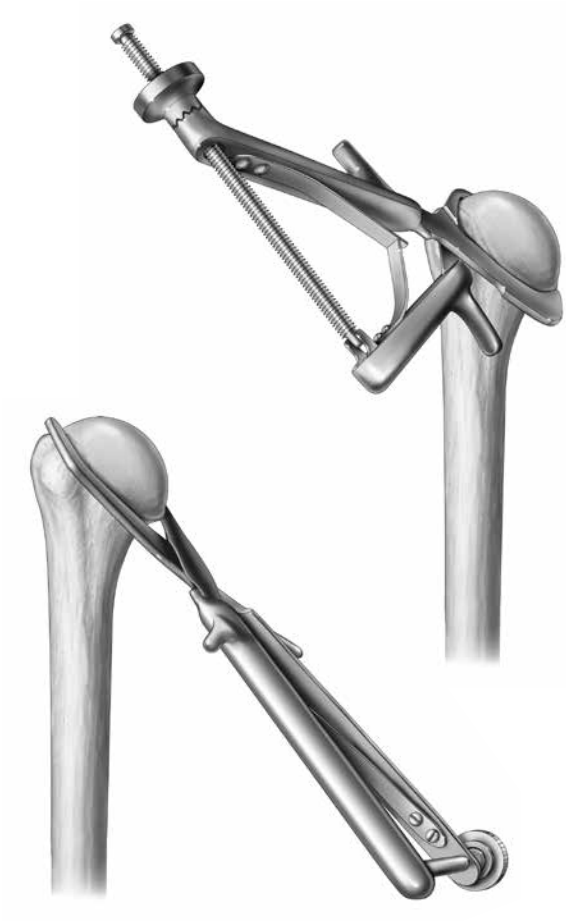


Figure 2
Anatomic Cutting Guide

Figure 3
Fixed Angle Cutting Guide

The resection should proceed from inferior to superior. The smaller jaw of the guide should be placed along the sulcus adjacent to the greater tuberosity superiorly. The wide jaw should be in direct contact with the medial and inferior portion of the anatomic neck. Alternatively, an anterior-posterior cutting approach can be used with the thin jaw encircling the posterior side of the anatomic neck and the cutting jaw positioned anteriorly *(Figure 2)*. Once the guide is in position, it is secured using the threaded knob. To ensure the cutting guide does not change position, the handle should be gripped while the osteotomy is performed; alternatively, two small K-wires (0.062 inches) can be inserted through the cannulated portions of the wider jaw.

Note: *Removing the osteophytes is suggested in order to visualize the anatomic neck, but it also improves the bite obtained by the teeth on the cutting guide.*

Free Hand: The anatomic neck is identified and the head is resected using a microsaggital saw at, or just distal to, the anatomic neck.

Fixed Angle (132.5 degrees) Cutting Guide: Three options are available for the Fixed Angle Cutting Guide *(Figure 3)*:

1) Using the cutting surface to mark the resection line with a bovie and then use the free hand method

2) Attaching the guide to a handle, which aligns with the forearm to provide 20 degrees of retroversion

Figure 4
Insert Reamer

3) Using K-wires to secure it to the proximal humerus. The Fixed Angle Cutting Guide is not used from the superior approach. Once the head is resected, the surgeon can either proceed directly to the glenoid or continue to prepare the humerus. The latter allows the stem protector to be used to minimize damage to the proximal humerus while exposing the glenoid.

Reaming the Humeral Shaft

The smallest Reamer (7mm) has a sharp tip to facilitate the initial entry into the IM canal *(Figure 4)*. The entry point is made just posterior to the bicipital groove and at the junction of the middle and upper thirds of the resected humeral surface. The canal should be sequentially reamed until endosteal cortical contact is obtained. It is imperative that the Reamer be inserted into the canal to the appropriate depth as indicated by the depth markers; reaming prepares the canal for the distal diameter of the stem and determines the final diameter of the definitive stem. There is no need for forceful reaming. If there is difficulty fully inserting a reamer, the broach and implant selected should be the size of the last reamer that was completely seated. If there is any concern about the size of the implant to use, the smaller alternative should be selected since the stem will be cemented in place.

Note: *To ensure the adequate depth is achieved, ream until the depth marker is no longer visible.*

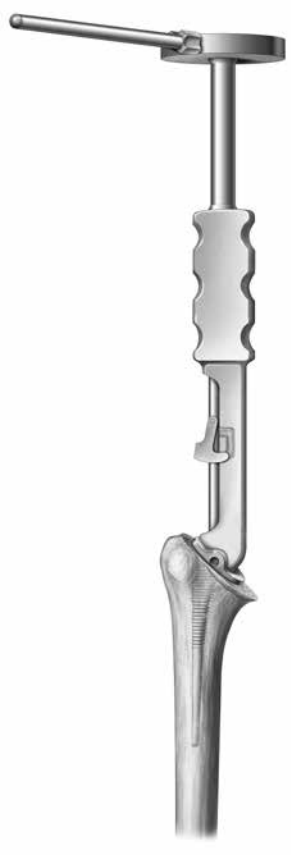


Figure 5
Insert Broach

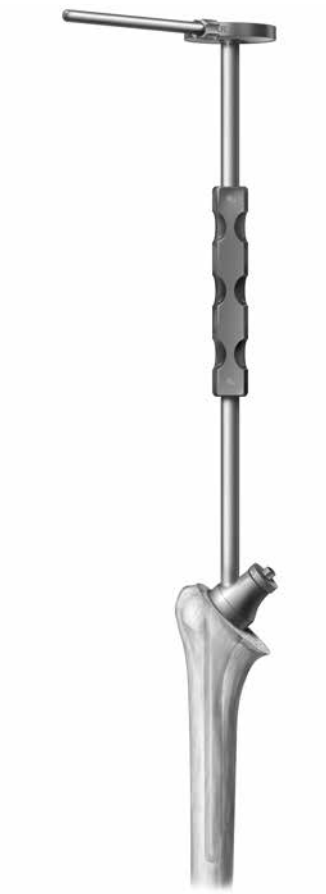


Figure 6
Insert Stem Trial

Broaching the Humeral Shaft

After the canal has been reamed, the smallest Broach (7mm) is attached to the Broach Handle *(Figure 5)*. The Broach should be inserted into the canal at a version consistent with that of the cut surface (i.e., the broach collar should be flush with the resected surface). The canal should be sequentially broached until the size of the Broach matches that of the final Reamer. Each Broach should be impacted until contact is made between the metaphyseal surface and the broach collar. The Broach should not be countersunk and only the strike surface should be used for impaction.

As a visual check to assess version, the Retroversion Handle can be attached to the Broach Handle ("L" and "R" indicate appropriate side) and aligned with the patient's forearm (assuming the patient has a stable elbow). The Retroversion Handle, when aligned with the forearm, indicates 20 degrees of retroversion. Care should be taken not to broach in more than 20 degrees of retroversion as this will limit internal rotation.

Note: *The Broach is securely locked to the Broach Handle when the latch is returned to the starting position.*

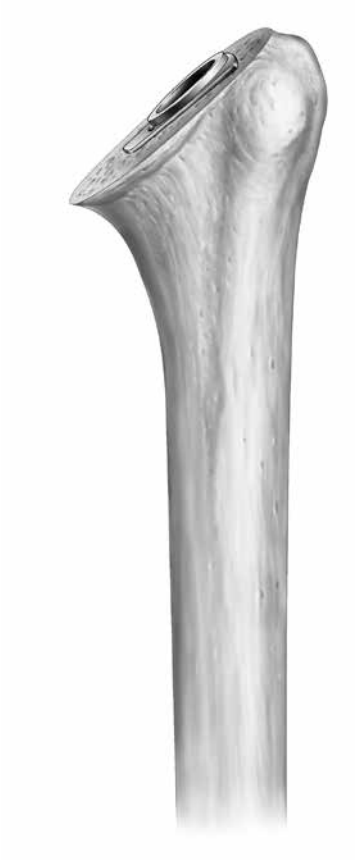


Figure 7
Implanted Stem Trial

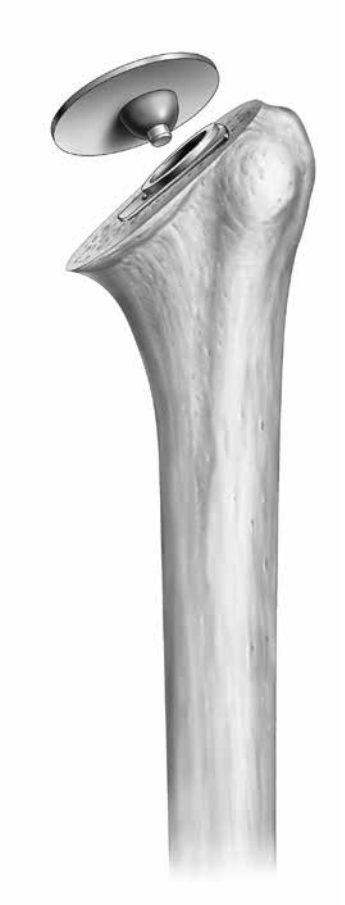


Figure 8
Stem Protector

Inserting the Humeral Stem Trial

The trial humeral stem size is determined by the largest Reamer that was fully inserted to the appropriate depth *(Figure 6)*. The Humeral Stem Trial is attached to the Stem Inserter and impacted until it is fully seated in the humerus *(Figure 7)*. **The trial is sized line-to-line with the Broach and Reamer. It is important to note that the reverse humeral component is intended to be used in either cemented applications or with an uncemented Equinoxe stem in revision cases when the component is well-fixed and stable, as determined by the orthopaedic surgeon's clinical and radiographic assessment.**

Humeral Stem Protector

The humeral Stem Protector should be placed into the proximal portion of the implanted stem to protect the resected surface during glenoid preparation *(Figure 8)*.

Note: *The Stem Protector is offset so it can be rotated to ensure the best possible coverage.*

STEP 4: PREPARING THE GLENOID

Glenoid Exposure

Retractors are provided to aid in glenoid exposure. A Posterior Glenoid Retractor (e.g. **Wolfe Retractor**) should be used to displace the proximal humerus posteriorly. A single- or double-spiked glenoid retractor is then placed anteriorly along the glenoid neck. Hohmann Retractors are placed superiorly and inferiorly around the glenoid.

The glenoid labrum is excised circumferentially to expose the entire surface of the glenoid. Any remaining portions of the biceps tendon also should be excised. There is often a significant amount of tissue around the glenoid that represents bursal tissue and remnants of rotator cuff tendons. This should be excised to enhance visualization. The superior, anterior and inferior capsule should be released both for exposure and mobilization. A posterior capsular release may be beneficial to allow the proximal humerus to be retracted posteriorly for adequate glenoid exposure.

At this point, the degree and location of glenoid erosion can be visualized. This should be carefully and completely assessed so that glenoid reaming can be performed to provide proper orientation of the glenoid component. Exposure of the glenoid also will be facilitated by use of specific retractors. For a deltopectoral approach, a Posterior Glenoid Retractor is essential. The **Forked and Wolfe Retractors** provided in the instrument set can be useful for this purpose. Levering retractors should be placed anteriorly, superiorly and inferiorly to expose the glenoid margins.

When a superior approach is used, the inferior capsular release is particularly important. The Forked Retractor can then be placed inferiorly to retract the proximal humerus posteroinferiorly for glenoid exposure. Levering retractors should be placed anteriorly, superiorly and posteriorly as described.

Note: *While the Equinoxe Glenoid Plate does not need to be inferiorly tilted or angled, it should not be implanted with a superior tilt. A neutral orientation is ideal.*

Reaming the Glenoid

The Equinoxe Reverse System provides two options to ream the glenoid: 1) **Pilot-Tip** and 2) **Cannulated Reamers** (*Figure 9a,b)*. Cannulated Reamers rotate about a 0.079 inch K-wire and provide the surgeon maximum precision.

Note: *Avoid applying a bending force to the pilot tip reamer or using the reamer to retract the humeral head as this may cause fracture of the 2mm K-wire or pilot tip.*

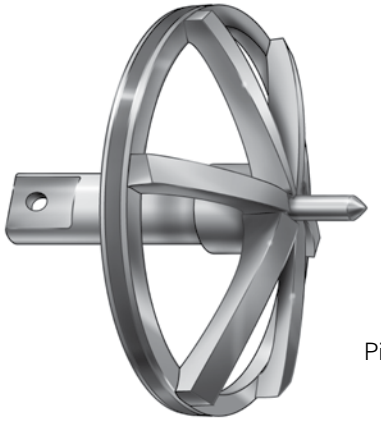


Figure 9a
Pilot-Tip Reamer

Figure 9b
Cannulated Reamer

Figure 10a
Deltopectoral Approach

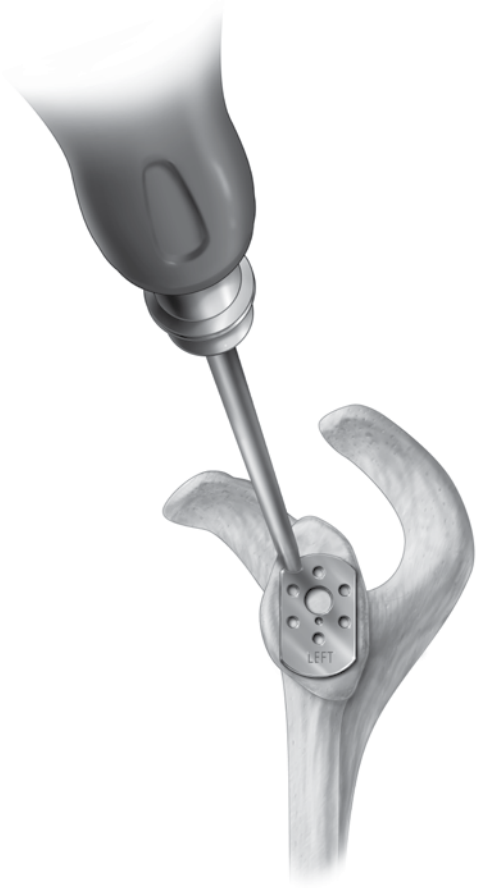


Figure 10b
Superolateral Approach

Regardless of the reaming option, the **Modular Glenoid Plate Drill Guide** and baseplate should be aligned 1-2mm distal to the inferior glenoid rim to avoid scapular notching (*Figure 10a,b*). This ensures the glenosphere is properly positioned in a superior-inferior position. Palpate the anterior glenoid neck to determine the angle for glenoid reaming.

Note: *Two handle orientations are offered for the two different surgical approaches.*

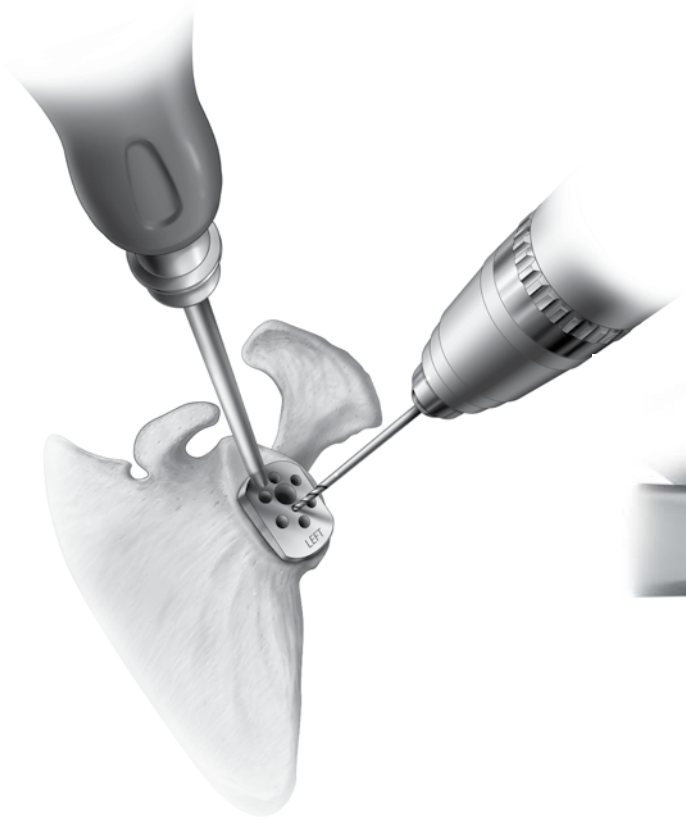


Figure 11
Drill 2mm Pilot Hole

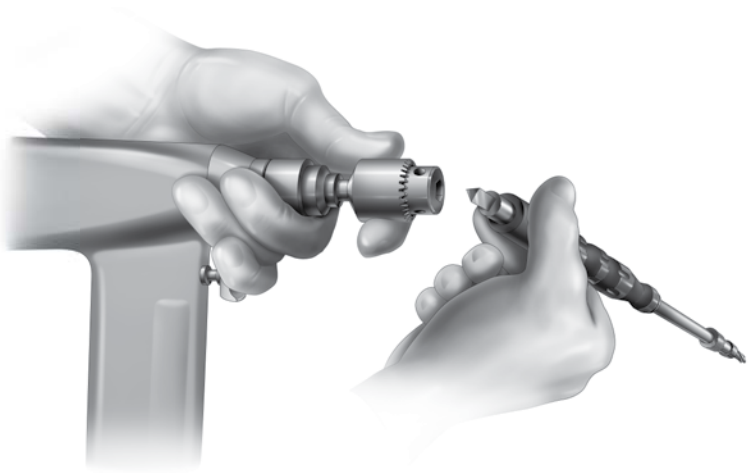


Figure 12
Connect the Modular Glenoid Driver

Pilot-Tip Reamers

If using the Pilot-Tip Reamers, the 2mm pilot hole is drilled to create the central axis for reaming the glenoid *(Figure 11)*. The **Reverse Starter Reamer** is provided for each reamer type to aid the surgeon in initial preparation. Connect the Modular Glenoid Driver to the powered hand piece using a Jacobs Chuck *(Figure 12)*.

Size	Color of Reamer and Trials
38	Blue
42	Yellow

Table 1
Color-coded Reamers and Trials

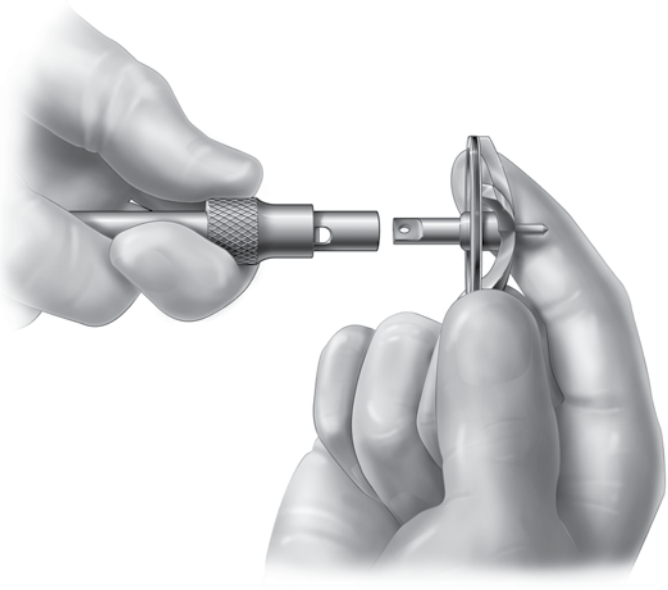


Figure 13
Connect Modular Reverse Pilot-Tip Reamer to Glenoid Driver

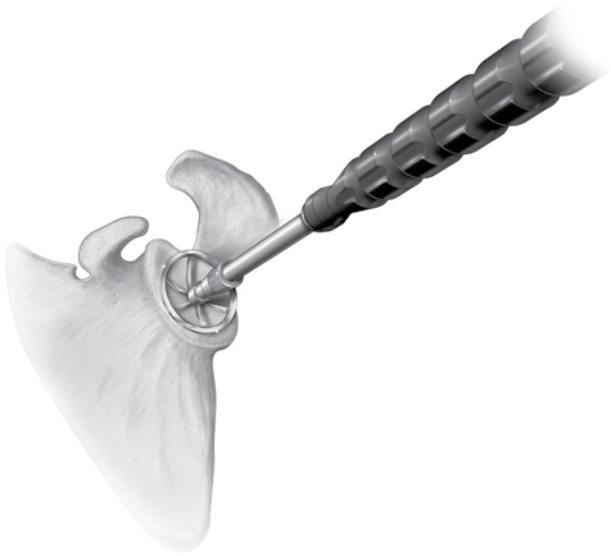


Figure 14
Ream the Glenoid

Next, connect the appropriately sized **Modular Reverse Pilot-Tip Reamer** to the **Modular Driver** *(Figure 13)*.

The reamer tip is placed into the drilled pilot hole and the glenoid is sequentially reamed until any pre-identified glenoid erosions are corrected and the glenoid surface has been fully contoured *(Figure 14)*. Reaming begins with the Reverse Shoulder Starter Reamer and progresses to the 38mm and 42mm sizes based upon the anticipated size of the glenosphere.

It is critical to ream to the size of the largest potential glenosphere that the surgeon might use to ensure that the glenosphere will fit on the face of the glenoid without peripheral bony impingement (i.e., the glenoid plate will already be fixed to the glenoid and upsizing the glenosphere during trialing will not be possible if the corresponding reaming has not already been performed). Reamers are available in color-coded sizes that correspond to the three sizes of Glenospheres as described in *Table 1.*

SURGICAL TIP
Start the reamer prior to engaging bone.

Size	Color of Reamer and Trials
38	Blue
42	Yellow

Table 1
Color-coded Reamers and Trials

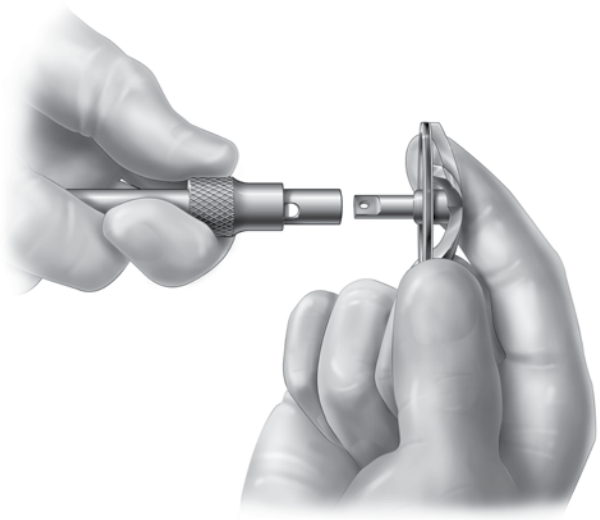


Figure 15
Connect Modular Reverse Cannulated Reamer to Glenoid Driver

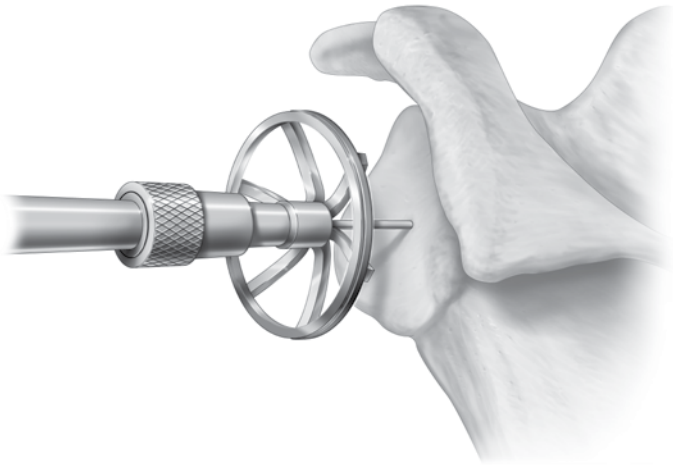


Figure 16
Ream the Glenoid

Cannulated Reamers

If using the Cannulated Reamers, align the **inferior aspect** of the **Modular Glenoid Plate Drill Guide** with the **inferior aspect** of the native glenoid bone. Drill the 0.079 inch K-wire through the 2mm pilot hole of the Modular Glenoid Plate Drill Guide. Connect the appropriately sized Modular Cannulated Reamer (note that the reamers are color coded) to the Modular Driver *(Figure 15)*.

Reaming begins with the Reverse Shoulder Starter Reamer and progresses to the 38mm and 42mm sizes based upon the anticipated size of the glenosphere. Sequentially ream the glenoid over the K-wire until any pre-identified glenoid erosions are corrected and the glenoid surface has been fully contoured *(Figure 16)*.

It is critical to ream to the size of the largest potential glenosphere that the surgeon might use to ensure that the glenosphere will fit on the face of the glenoid without peripheral bony impingement (i.e. the glenoid plate will already be fixed to the glenoid and upsizing the glenosphere during trialing will not be possible if the corresponding reaming has not already been performed). Reamers are available in color-coded sizes that correspond to the three sizes of Glenospheres as described in *Table 1.*

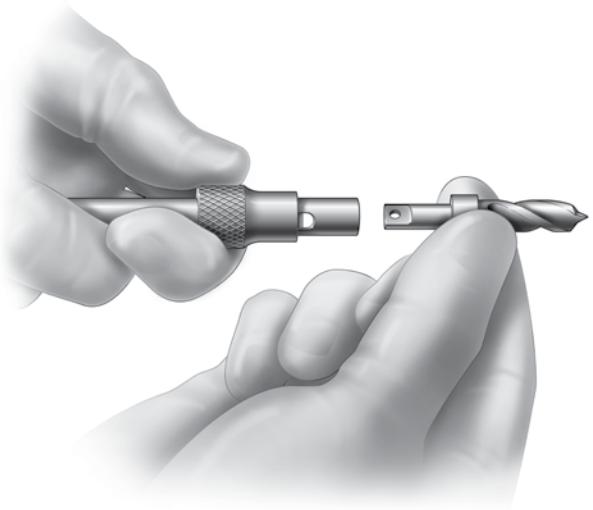


Figure 17
Connect Modular Glenoid Plate Drill to Glenoid Driver

Figure 18
Drill Glenoid Plate Hole

Drill Cage Hole through Drill Guide

After reaming has been completed, the **inferior aspect** of the Modular Glenoid Plate Drill Guide is realigned with the **inferior aspect** of the glenoid. Connect the **Modular Glenoid Plate Drill** to the **Modular Driver** to prepare the glenoid for the cage hole of the Glenoid Plate *(Figures 17 and 18)*. The Glenoid Plate Drill is 7.3mm in diameter. The Glenoid Plate cage is tapered and varies in diameter between 7.5mm at its end to 8.1mm where it joins the back of the Glenoid Plate.

Note: *Modular Cannulated Center Peg Drill Option: After reaming over the 0.079 inch* K-wire, drill over the existing K-wire with the Modular Cannulated Center Peg Drill.

Figure 19
Assemble the Glenoid Plate with Bone Graft

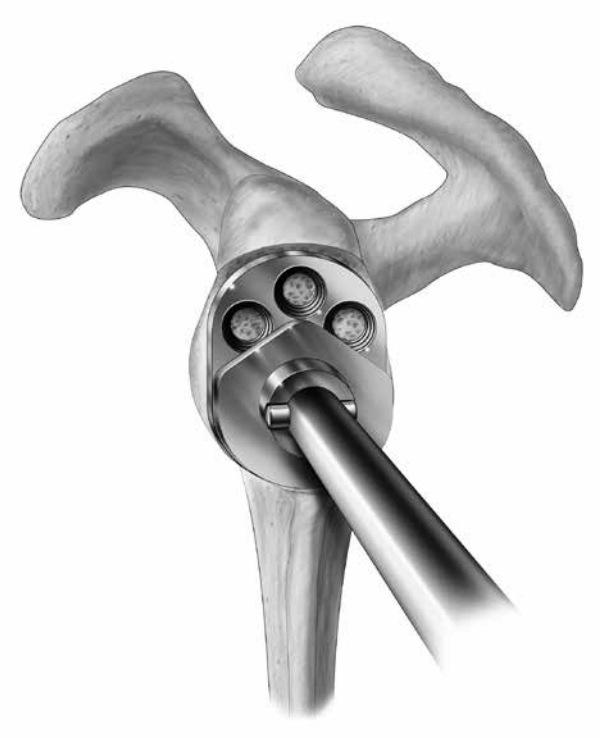


Figure 20
Insert Glenoid Plate

Bone Graft for Glenoid Plate
Two options exist for placing bone graft in the glenoid plate's cage *(Figure 19)*.

1) Using the **Glenoid Plate Coring Reamer** to create a 6mm autograft bone column from the humeral head,or other suitable location as deemed appropriate by the surgeon, and inserting the bone column directly into the cage.

2) Placing allograft (e.g., 1cc of either Optecure® with ccc or Optecure in a syringe) or morselized autograft manually into the cage.

Note: *Take care to prevent bone graft from getting on the screw-hole threads as this could prevent adequate screw engagement.*

Implanting the Glenoid Plate
Once the cage hole is drilled, the Glenoid Plate is attached to the **Glenoid Plate Inserter** and the Glenoid Plate is press-fit into position taking care to respect the correct rotational orientation **(i.e., the guide and baseplate should be aligned 1-2mm distal to the inferior glenoid rim to avoid scapular notching)** *(Figure 20)*.

The Inserter connects to the **bottom half** of the Glenoid Plate such that the central pin aligns with the threaded central hole and the peripheral legs connect to the bottom peripheral holes of the Glenoid Plate.

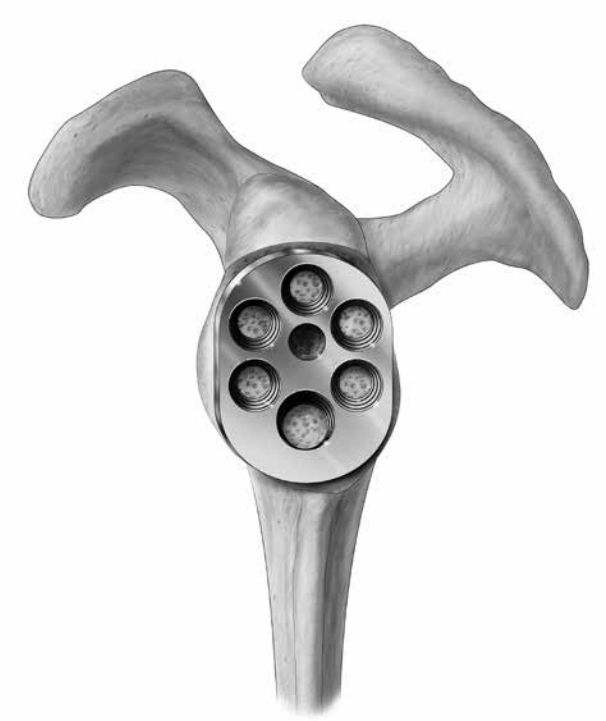


Figure 21
Implant Glenoid Plate

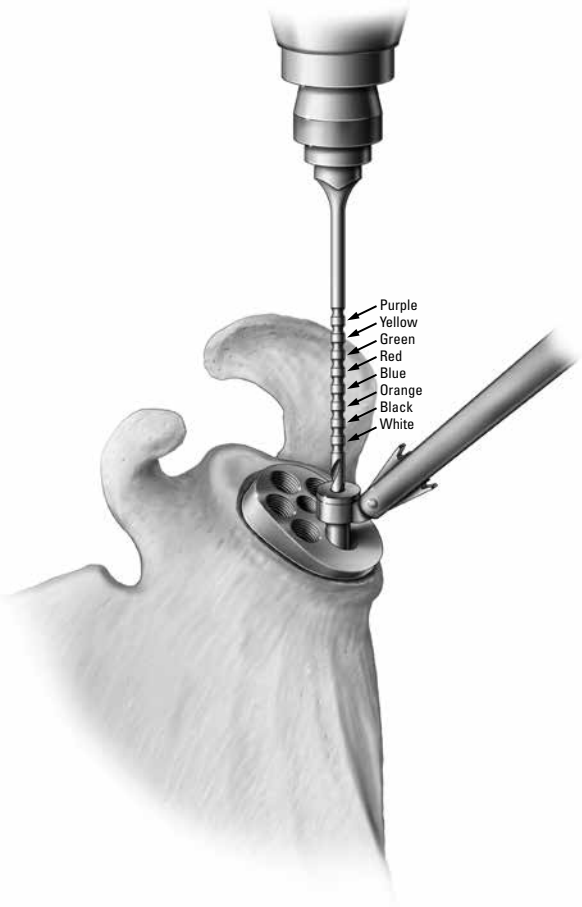


Figure 22
Drill Inferior Hole

Four of the six potential screw locations that will provide optimal fixation and support of the glenoid plate are identified. Primary reverse shoulders will most typically use the superior and three inferior holes based on the anatomy of the native glenoid. The two peripheral holes on the superior part of the plate are intended for revision cases in which the native glenoid bone is compromised. However, each case should be individualized and the six holes provide the surgeon with additional options to maximize fixation of the Glenoid Plate *(Figure 21)*.

Four holes should be drilled using the **Adjustable Angle Drill Guide** and the **3.2mm Drill** *(Figure 22)*, taking note of the depth of each hole using either the color-coded drill or the traditional depth guide. Each hole allows 30 degrees of angular variability so the orientation of the screws can be selected to maximize purchase.

Note: *The central cage of the glenoid plate limits the angular variability to 20 degrees for converging anterior, posterior and superior screws.*

DETAILED OPERATIVE TECHNIQUE

PREPARING THE GLENOID

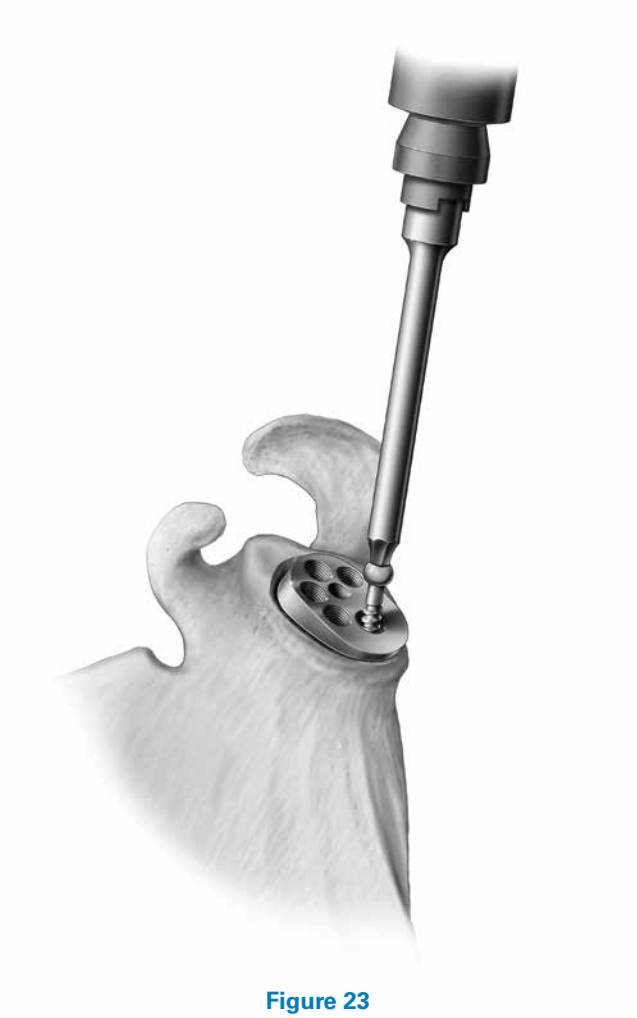


Figure 23
Implant Screw

Length (mm)	Diameter (mm)	Color-code
18	4.5	White
22	4.5	Black
26	4.5	Orange
30	4.5	Blue
34	4.5	Red
38	4.5	Green
42	4.5	Yellow
46	4.5	Purple

Table 2
Compression Screws

The inferior screw should track along the inferior scapular neck and the superior screw should be targeted to track along the base of the coracoids *(Figure 23)*. The anterior and posterior screws should be inserted where the surgeon feels the best bone purchase can be achieved, taking note not to drill into the central cage of the Glenoid Plate.

The 4.5mm **Compression Screws** are provided in lengths between 18mm and 46mm, in 4mm increments. The appropriately sized Compression Screws *(Table 2)* are inserted into the drilled holes to achieve fixation and compression of the Glenoid Plate to the glenoid. If power is used to initially insert the screws, caution should be taken to perform the final seating by hand. This will maximize fixation.

A **Ratcheting Screw Drive** is included in the instrument set to facilitate the placement and tightening of the screws.

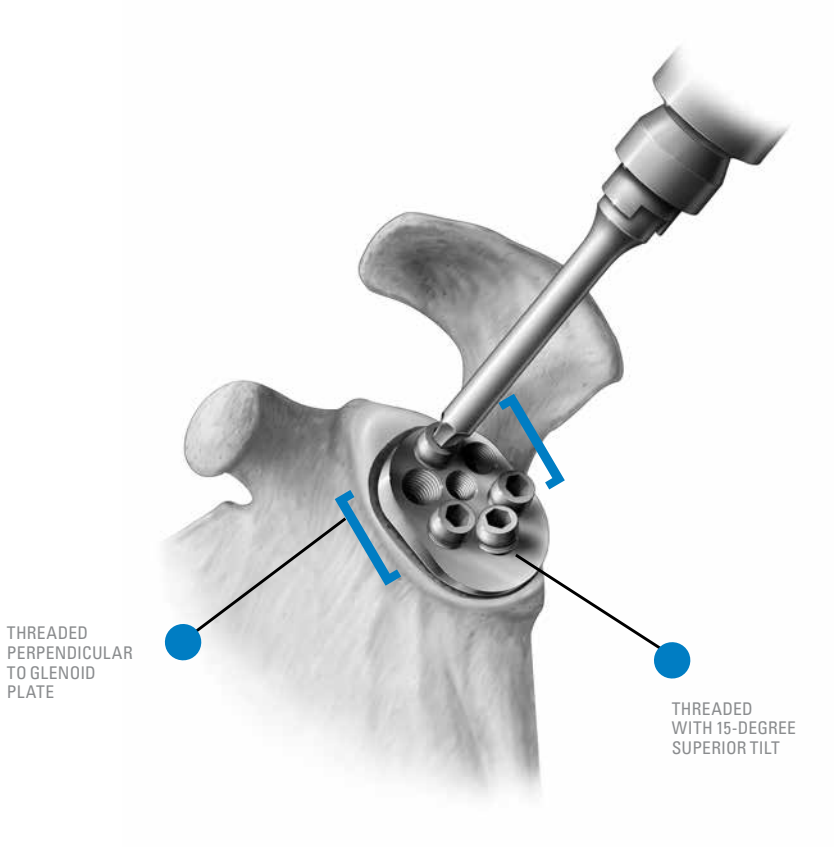


Figure 24
Locking Cap

After all Compression Screws are tightened by hand, as deemed appropriate by the orthopaedic surgeon, the surgeon should insert the Locking Caps into each screw hole. This will lock each Compression Screw and prevent the screws from backing out. Each Locking Cap is inserted perpendicular to the plate with the exception of the inferior one, which must be threaded at a 15-degree superior tilt *(Figure 24)*.

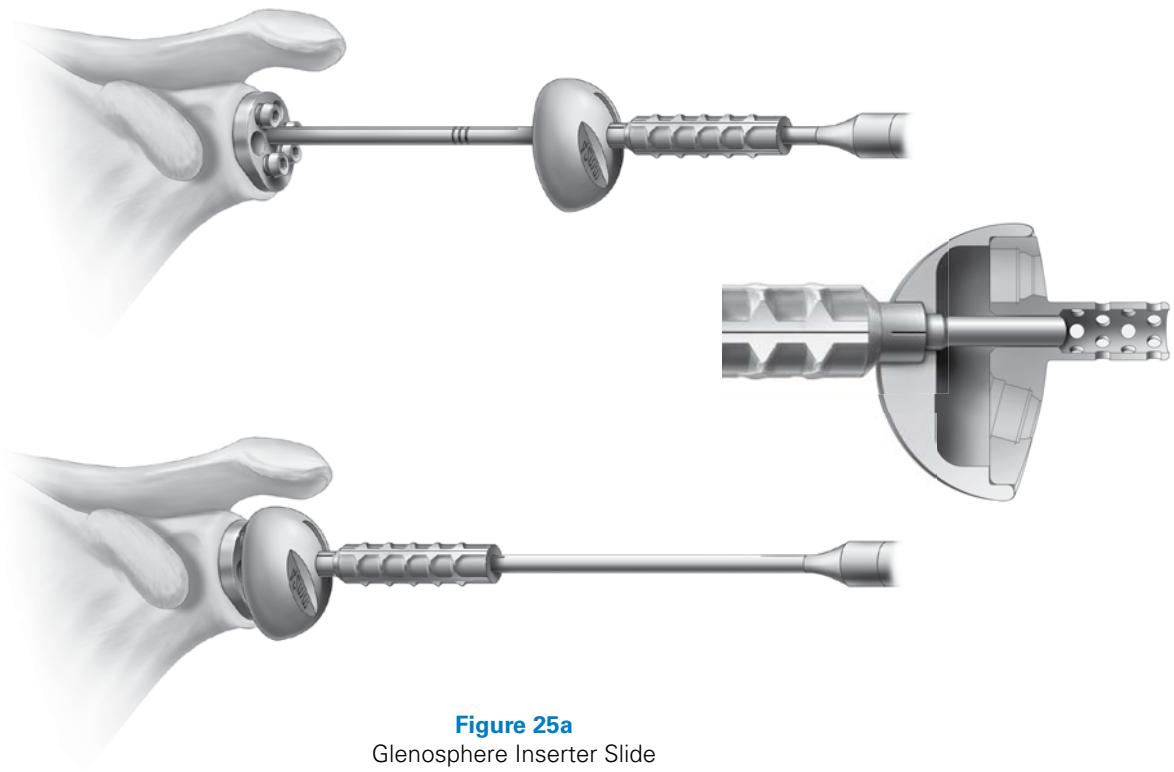


Figure 25a
Glenosphere Inserter Slide
and Spring Handle

Inserting the Glenosphere Trial

Attaining adequate glenoid exposure is critical for this step, especially posterior glenoid exposure. The Posterior Glenoid Retractor included in the set can help provide the posterior clearance necessary to implant the **Glenosphere**.

The appropriately sized Glenosphere is defined by implanting the largest one that can be inserted based upon exposure and the coracoacromial arch anatomy (ensuring that it was reamed up to that size during the glenoid reaming step). **Take note that unlike circular baseplates, the anatomical shape of the Equinoxe Glenoid Plate mandates that the Glenosphere can only fit in one specific orientation (i.e., the superior/inferior axis of the glenoid)**.

Attach the spring handle to the apical hole of the glenosphere so that rotational control is achieved. Place the pilot tip of the inserter slide through the spring handle and glenosphere and into the baseplate. Three circumferential laser marks (corresponding to the three sizes of glenospheres) are included on the slide to indicate the glenosphere has been fully seated on the baseplate. Additional alignment laser marks are included to help the surgeon maintain the correct orientation of the glenosphere. Maintain digital pressure on the glenosphere while removing the inserter *(Figure 25a)*.

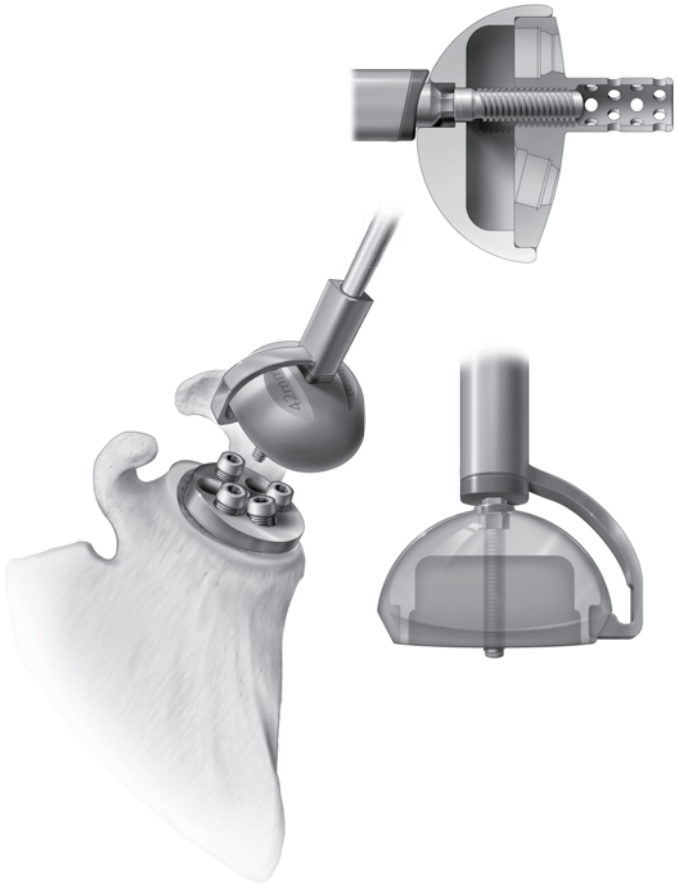


Figure 25b
Universal Glenosphere Inserter Clamp

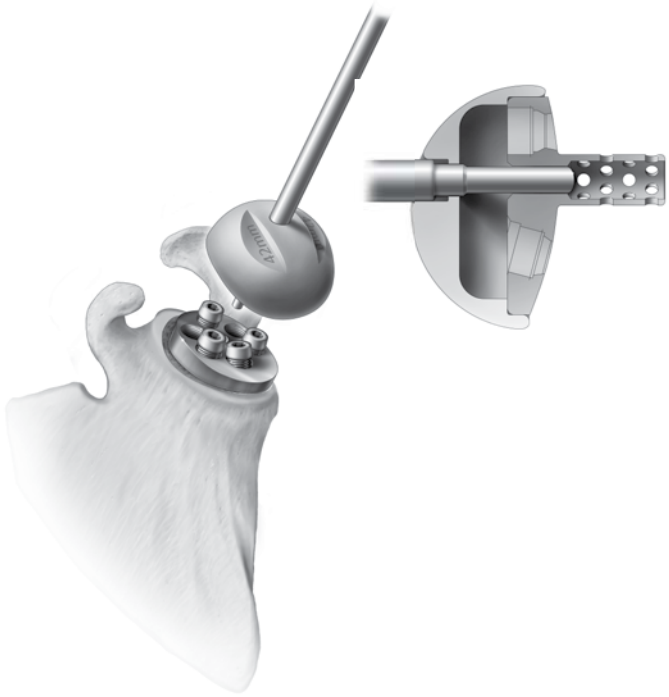


Figure 25c
Pilot Tapered Glenosphere Inserter

Universal Glenosphere Inserter Clamp: To engage the glenosphere, use the hook to grab the anterior cavity of the glenosphere so that rotational control is achieved. The Glenosphere Locking Screw may be inserted prior to engaging the handle or it can be inserted through the handle after it is in place. Once the inserter is attached to the glenosphere, insert the hex drive through the handle to engage the tip of the locking screw. This will hold the glenosphere in place during insertion. The glenosphere can then be maneuvered onto the Glenoid Plate by using the Glenosphere Locking Screw as a guide to the central hole and to ensure it is properly aligned relative to the bone cage. When the glenosphere is fully seated, drive the screw until it locks the assembly together *(Figure 25b)*.

Pilot Tapered Glenosphere Inserter: Attach the T-Handle to the inserter. Align the T-Handle in the north/south axis of the glenosphere to ensure that it is properly oriented with the Glenoid Plate. The pilot tip fits into the baseplate to aid in orienting the glenosphere onto the baseplate. Once the glenosphere is seated on the baseplate, apply digital pressure to ensure the glenosphere stays on the baseplate and remove the inserter. Do not attempt to impact the Pilot Glenosphere Inserter once the glenosphere is seated *(Figure 25c)*.

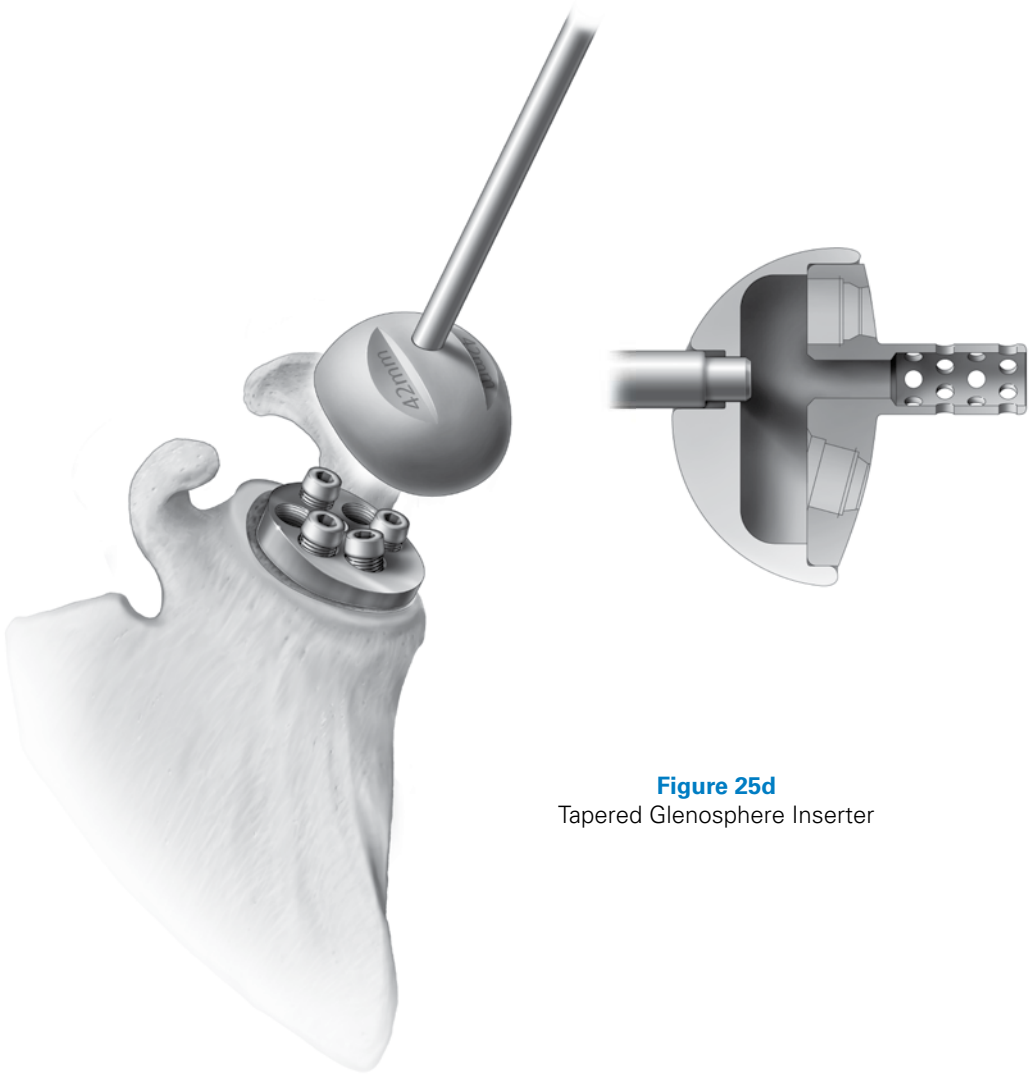


Figure 25d
Tapered Glenosphere Inserter

The Tapered Glenosphere Inserter: Attach the Tapered Glenosphere Inserter in the same manner as the Pilot Glenosphere Inserter. This instrument provides rotational stability and axial control. Since the instrument is cannulated, a 0.062 inch guide wire or K-wire can be inserted into the bone cage of the Glenoid Plate to aid with insertion *(Figure 25d)*.

Finally, the Glenosphere Trial is connected to the Glenoid Plate with the Glenosphere Locking Screw to prevent the Glenosphere from disengaging during trial reductions.

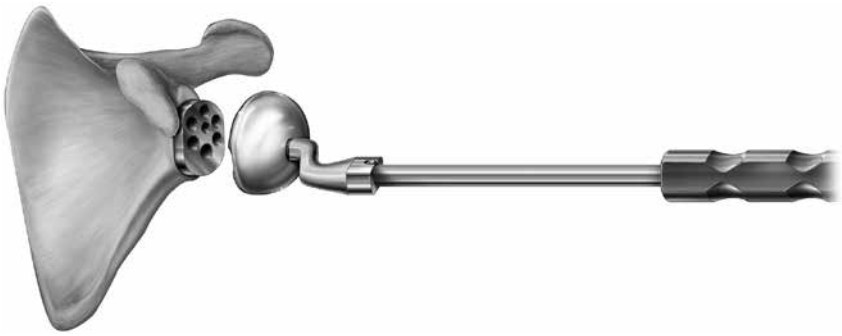


Figure 25e
Klimo Glenosphere Inserter

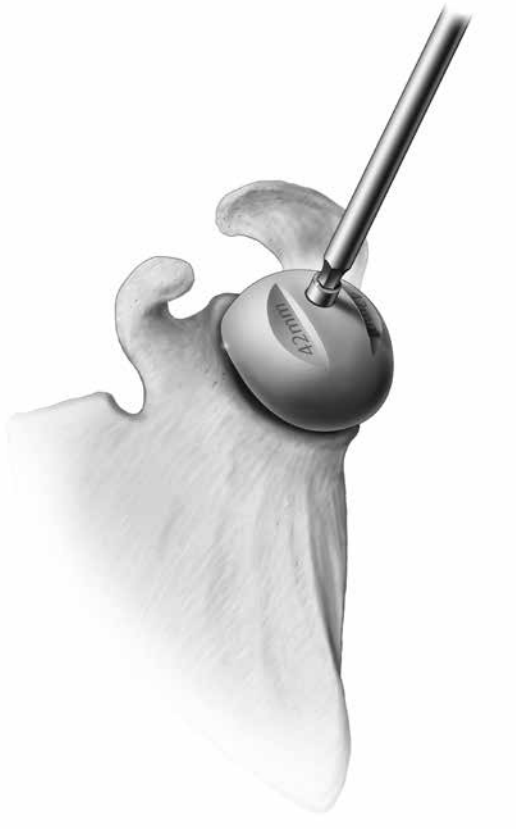


Figure 26
Glenosphere Locking Screw

Attach the Klimo Inserter to the impactor handle *(Figure 25e)*. The curved axis of the inserter (the elbow of the inserter) should be aligned at the three o'clock position for a right shoulder or the nine o'clock position for the left shoulder. For rotational stability and axial control, a mallet can be used to engage the inserter on the glenosphere by striking the top of the impactor handle. The Klimo Inserter helps to keep the glenosphere aligned with the long axis of the Glenoid Plate during insertion. Do not attempt to impact the Klimo Inserter once the glenosphere is seated.

SURGICAL TIP

The Glenosphere Locking Screw is placed perpendicular to the hole within the Glenosphere and the Glenoid Baseplate, which are aligned with one another. Note that the outer periphery of the apical hole of the Glenosphere is curved because of the intersection of the articular curvature on the superior surface of the device. The Glenosphere Locking Screw should not be inserted perpendicular to this articular curvature but instead be inserted perpendicular to the Baseplate and hole within the Glenosphere *(Figure 26)*.

TRIALING THE HUMERAL ADAPTER TRAY AND LINER

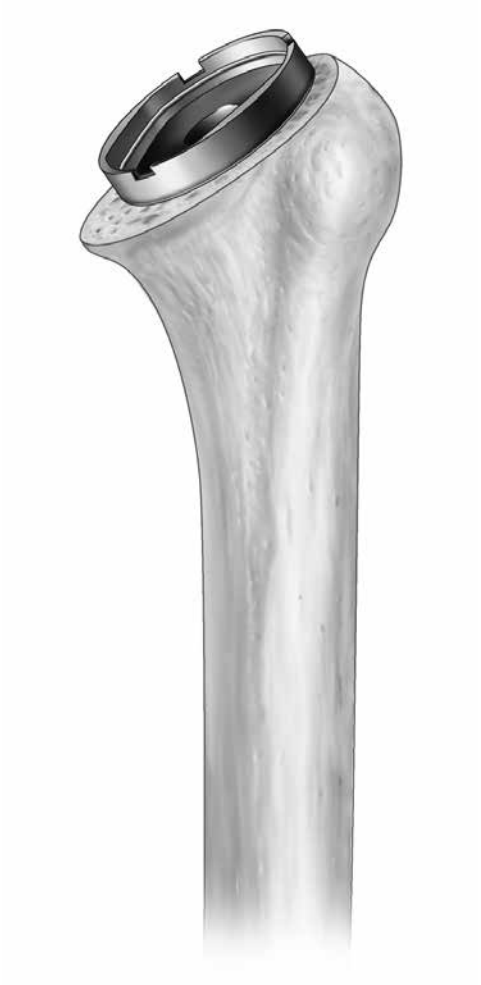


Figure 27
Humeral Tray Trial

Figure 28
Humeral Tray Trial and Liner Trial

STEP 5: TRIALING THE HUMERAL ADAPTER TRAY AND LINER

The +0mm **Humeral Adapter Tray Trial** is attached to the humeral stem by threading the **Humeral Adapter Tray Captured Screw** into the Humeral Stem's screw hole *(Figure 27)* (+10mm is also attached this way).

SURGICAL TIP
It is critical that the Humeral Adapter Tray be oriented such that the line on the Adapter Tray aligns with the lateral fin of the Humeral Stem.

The +5mm trial tray can be added as needed. For a +10mm offset and greater, remove the +0mm Humeral Adapter Tray Trial and insert the +10mm tray trial. To obtain a +15mm offset (special order) and larger, the +5mm tray trial will need to be added. Combinations of trays and liners can achieve the following offsets: +0, +2.5, +5.0, +7.5, +10.0, +12.5mm and available by special order +15 and +17.5mm. It is important to note that the assembled humeral component will have a humeral neck angle of 145 degrees because the liner adds 12.5 degrees to the stem's 132.5 degree neck angle *(Figure 28)*.

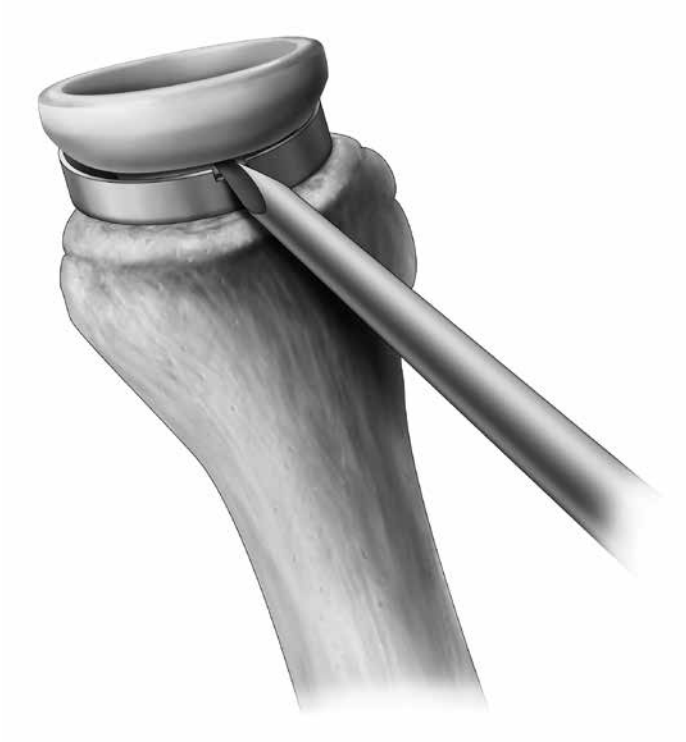


Figure 29
Liner Trial Removal

To insert the **Humeral Liner Trial** into the Trial Tray, the underside asymmetric-connecting feature should be appropriately aligned and the liner/tray trials should be pressed together until the C-spring engages. To disengage the trials, the tip of the **Humeral Liner Removal Tool** is inserted into the recessed region of the trial tray and the instrument is turned like a key until the spring that connects the Humeral Liner Trials and plate trials is disengaged, thereby freeing the Liner *(Figure 29)*.

The stability of the implant is assessed during a trial reduction. The shoulder should be placed through a range of motion to assess the stability of the construct. While each surgeon may have their own system to assess stability, we approach the trial reduction as follows:

1) With reduction and arm by the side, the lateral deltoid and conjoined tendon should be under tension. The expectation is that the reduction should require more distraction to achieve than reduction of non-constrained implants.

2) Forward elevation and abduction should be assessed to determine that the construct is stable and the components do not impinge on bony structures.

3) Internal and external rotation should be assessed with the humerus at 0 and 90 degrees to assess stability. Although maximal ranges of external rotation may produce some impingement posteriorly, it should not result in instability.

4) With the arm at the side, there should be no evidence of impingement that results in distraction of the implants.

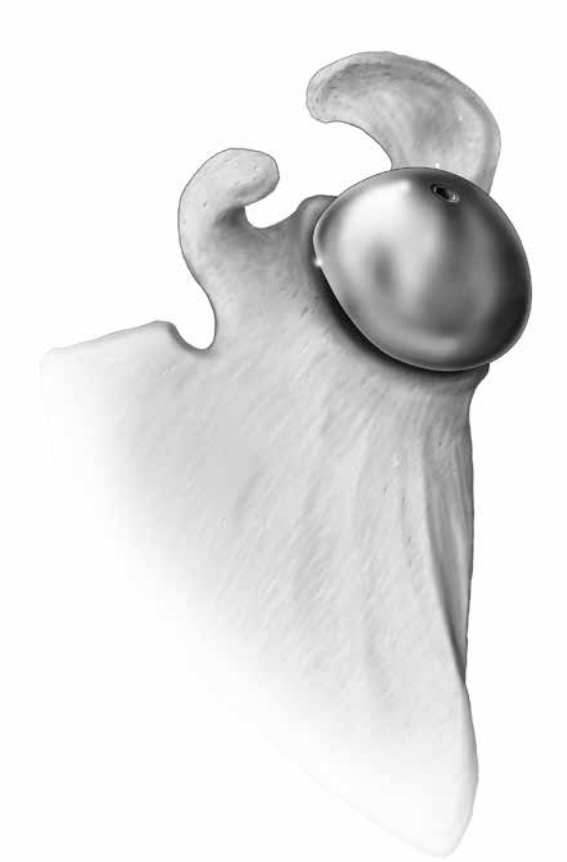


Figure 30
Insert Definitive Glenosphere and Screw

If additional stability is required based upon the trial reduction, constrained liner options are provided in the same offset as the standard liners. While constrained liners will provide better stability, it is important to note they will also reduce the potential range of motion that can be achieved. If tension is inadequate, additional offset can be added up to 12.5mm. If trial components are changed, additional closed reductions and assessments should be performed to confirm that the desired stability has been obtained. In the unusual situation in which the +0mm liner is too tight, the humeral component should be removed and additional bone should be resected using the methods described.

STEP 6: INSERTING THE FINAL IMPLANTS

The Humeral Liner Trial, Humeral Adapter Tray Trial and Glenosphere Trial are removed. The final Glenosphere is implanted in the same manner used with the Glenosphere Trial. Impaction of the Glenosphere is not necessary since it is not a morse taper. The Glenosphere is secured with the Glenosphere Locking Screw, which employs a Spiralock® technology *(Figure 30)*.

SURGICAL TIP

If you hear the Glenosphere Locking Screw "squeaking" prior to the screw head being recessed in the Glenosphere apical hole—STOP. The Glenosphere is not seated on the baseplate correctly. Run an instrument along the backside of the Glenosphere to feel for the plate. You should not feel any of the plate if the Glenosphere is seated properly. You can also visually assess this anteriorly.

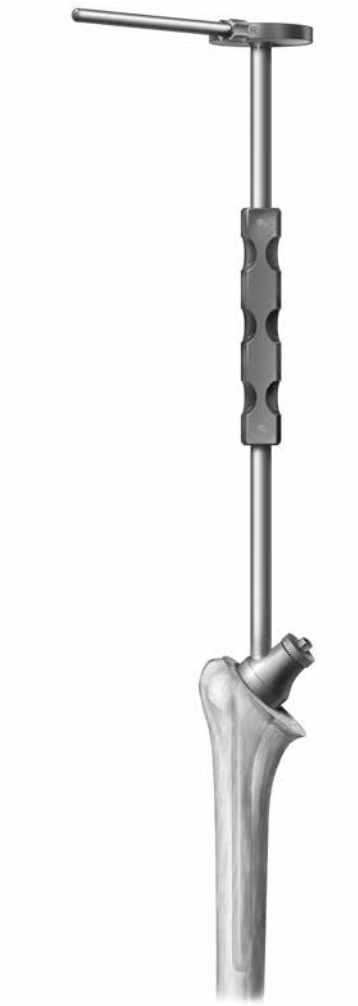


Figure 31
Cement Definitive Stem

The arm should be placed in extension and the Primary Stem Inserter should be attached to the humeral stem. The stem can now be removed in order to prepare for cementing the stem. **Downsizing the definitive stem from the trial will result in a 1.5mm proximal cement mantle and a 2mm distal cement mantle. Alternatively, the proximal humerus can be broached one size larger than the trial stem (the broaches are tapered distally to allow this technique) and the same size stem can be used as the trial. This provides for a 1.5mm proximal cement mantle and a line-to line fit distally.** In the majority of cases, the proximal humerus will tolerate broaching an additional size to accommodate the cement mantle (i.e., if an 11mm stem was used, then a 13mm Broach should be inserted to prepare for cementing). However, the Broach must not be forced if there is not adequate proximal humerus to fully seat the larger broach. Adequate stability can still be obtained with a minimal cementation technique. Cementing of the stem should proceed based upon the surgeon's preferred technique *(Figure 31)*. The Stem Inserter should be used with the stem impacted into place until it is at the level of the bony surface.

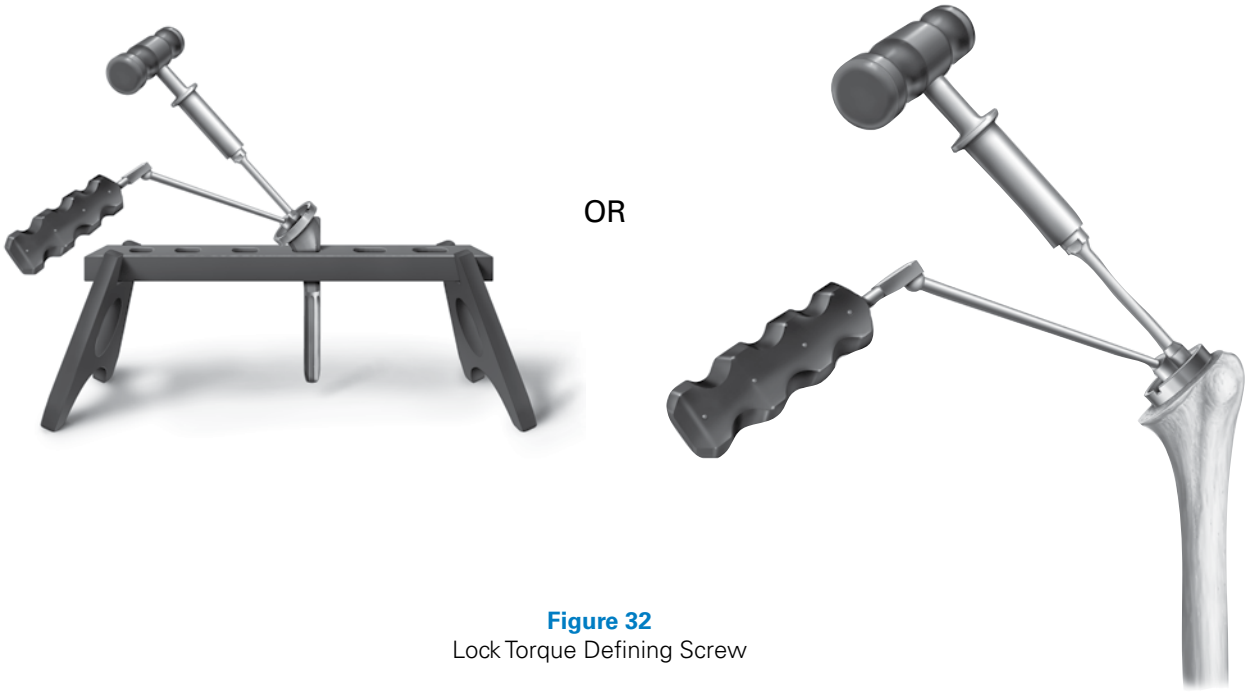


Figure 32
Lock Torque Defining Screw

The final Humeral Adapter Tray is attached to the Humeral Stem using the **Reverse Torque Defining Screw** *(Figure 32)*.

SURGICAL TIP
It can be helpful to place the Torque Defining Screw through the humeral tray before connecting it to the stem so that the threads engage more easily.

Impact the T-handle with a Mallet to ensure the driver is fully engaged in the screw. Failure to fully engage the UHMWPE plug on the screw head may prevent the screw head from being retained by the torque defining screw driver.

It is critical that the Humeral Adapter Tray be oriented properly, which requires aligning the indicator mark on the tray with the lateral fin on the stem. The plate is locked to the stem by applying 11 N·m torque to the Screw with the supplied driver while countering the torque to the arm with the **Reverse Shoulder Modular Replicator Handle**. The superior portion of the Screw will disengage when 11 N·m is reached (and will remain in the Screw Drive, both of which are disposable). After the head of the Torque Defining Screw disengages at 11 N·m, verify that the screw head is retained by the Torque Defining Screw Driver.

The final Humeral Liner is attached to the Humeral Adapter Tray by orienting the asymmetric connecting features **and sliding the lip of the liner under the superior rim of the Humeral Tray**.

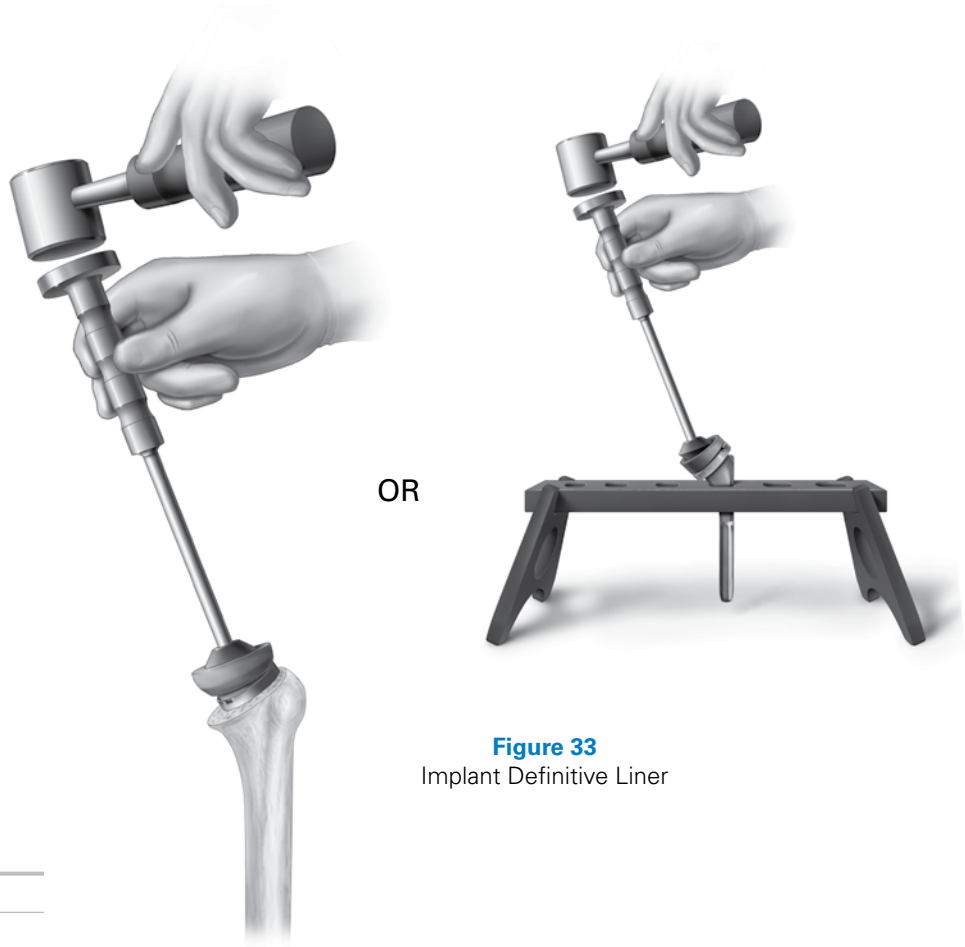


Figure 33
Implant Definitive Liner

Size	Color of Impactor Tips
38	Blue
42	Yellow

Table 3
Impactor Tips

SURGICAL TIP
The big lip of the poly should be inferior with the Equinoxe Reverse. As noted on the previous page, it can also be helpful to place the Torque Defining Screw through the humeral tray before connecting it to the stem so that the threads engage more easily.

As with the trial insertion, it is important to note that the assembled humeral component will have a humeral neck angle of 145 degrees because the Humeral Liner adds 12.5 degrees to the stem's 132.5-degree neck angle. Finally, the apical mushroom of the Humeral Liner is engaged to the apical lock of the Humeral Adapter Tray by impacting the Humeral Liner with the appropriately sized **Humeral Liner Impactor Tip** *(Table 3)*.

The humeral liner should be impacted until it sits flush on the Humeral Adapter Tray *(Figure 33)*. At this point, the humeral component should be reduced onto the Glenosphere. Range of motion and stability should be assessed to confirm the findings from the trial reduction. Once this assessment has been made, closure can be performed.

Alternatively, the stem, tray and liner can be assembled using the Back Table Assembly Stand first and then placed as a unit into the humerus with cement. The disadvantage of this technique is that further implant trialing is not possible, so it should only be used when the surgeon is confident about the thickness of the tray and liners based on the previous trialing. The advantage of this technique is that the shoulder can be reduced and the surgeon can begin closing while the cement is hardening.

STEP 7: DELTOPECTORAL CLOSURE

If the subscapularis tendon was divided during the approach it should be reattached at this time. The method of reattachment is based upon surgeon preference and is generally determined by the method of tenotomy performed. The repair will be either tendon-to-tendon or tendon-to-bone using #2 heavy non-absorbable sutures. We prefer the use of a drain because of the relatively large dead-space and the potential for hematoma formation. The use of a drain will limit the risk of hematoma formation. The deltopectoral interval is closed followed by closure of the subcutaneous tissue and the skin. The upper extremity is then placed in a sling and swathe.

STEP 8: SUPEROLATERAL CLOSURE

A drain should be inserted to minimize the risk of post-operative hematoma formation. The anterior deltoid should be repaired directly to the anterior acromion with #2 non-absorbable sutures passed through drill holes. The split between the anterior and middle deltoid should be repaired with absorbable sutures. The subcutaneous tissue layer is then closed, followed by the skin closure. The upper extremity is then placed in a sling and swathe.

Radiographs are usually obtained in the operating room to document the position and alignment of the implants. The specific views obtained are based upon surgeon preference.

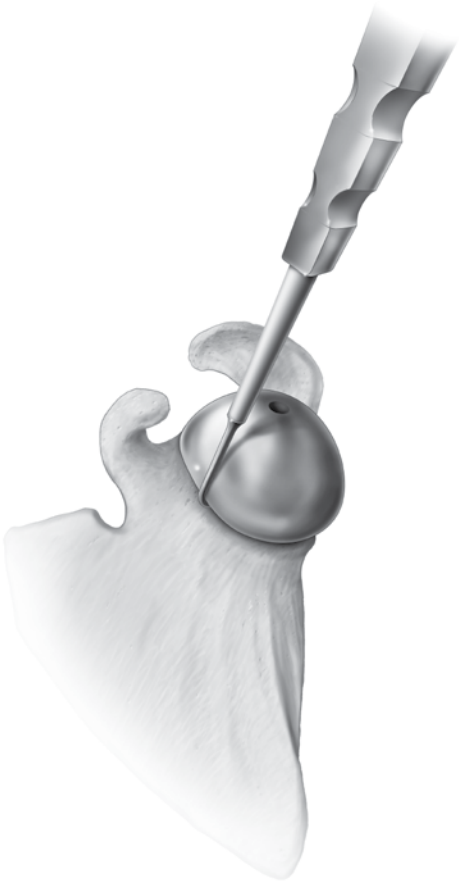


Figure 34
Remove Glenosphere

Glenosphere Removal

If the Glenosphere needs to be removed, the removal instrument can be used to hook into the anterior and posterior recesses on the underside of the Glenosphere to lever it off of the baseplate *(Figure 34)*.

Post-Operative Rehabilitation

The rehabilitation program can be carefully started on the same day as surgery or by postoperative day one. All patients should begin active range of motion of the elbow, wrist and hand. Range of motion of the shoulder consists of passive forward elevation, external rotation based on the intra-operative assessment and internal rotation to the chest wall. Isometric deltoid strengthening can also be started on post-operative day one. Patients should be instructed to perform these exercises five to six times per day for short periods of up to 10 minutes each session.

Some surgeons may prefer to treat the patient in a sling with no shoulder rehabilitation for a period of three to four weeks. **It is very important that caregivers do not pull up on the operated arm of the patient in an effort to assist the patient from bed or a chair as this might cause dislocation.**

The sling is discontinued after six weeks. A longer period of sling use is indicated if there is concern about the stability of the joint. When the sling is discontinued, active and active-assisted range of motion should begin. Internal rotation behind the back can also be started at this time. Isometric internal and external rotation is added at six weeks and gentle resistive strengthening of the deltoid and rotator cuff begins 10-12 weeks postoperatively. When the sling is removed, the patient is instructed to increase use of the upper extremity for activities of daily living.

IMPLANT LISTING

CATALOG NO.	PART DESCRIPTION
300-01-07	Humeral Stem, Primary, Press-Fit, 7mm
300-01-09	Humeral Stem, Primary, Press-Fit, 9mm
300-01-11	Humeral Stem, Primary, Press-Fit, 11mm
300-01-13	Humeral Stem, Primary, Press-Fit, 13mm
300-01-15	Humeral Stem, Primary, Press-Fit, 15mm
300-01-17	Humeral Stem, Primary, Press-Fit, 17mm
320-10-00	Humeral Adapter Tray, +0
320-10-05	Humeral Adapter Tray, +5
320-10-10	Humeral Adapter Tray, +10
320-10-15*	Humeral Adapter Tray, +15
320-36-00	Humeral Liner, 36mm, +0
320-36-03	Humeral Liner, 36mm, +2.5
320-36-10	Constrained Humeral Liner, 36mm, +0
320-36-13	Constrained Humeral Liner, 36mm, +2.5
320-38-00	Humeral Liner, 38mm, +0
320-38-03	Humeral Liner, 38mm, +2.5
320-38-10	Constrained Humeral Liner, 38mm, +0
320-39-13	Constrained Humeral Liner, 38mm, +2.5
320-42-00	Humeral Liner, 42mm, +0
320-42-03	Humeral Liner, 42mm, +2.5
320-42-10	Constrained Humeral Liner, 42mm, +0
320-42-13	Constrained Humeral Liner, 42mm, +2.5
320-20-18	Compression Screw/Locking Cap Kit, 4.5 x 18mm, White
320-20-22	Compression Screw/Locking Cap Kit, 4.5 x 22mm, Black
320-20-26	Compression Screw/Locking Cap Kit, 4.5 x 26mm, Orange
320-20-30	Compression Screw/Locking Cap Kit, 4.5 x 30mm, Blue
320-20-34	Compression Screw/Locking Cap Kit, 4.5 x 34mm, Red
320-20-38	Compression Screw/Locking Cap Kit, 4.5 x 38mm, Green
320-20-42	Compression Screw/Locking Cap Kit, 4.5 x 42mm, Yellow
320-20-46	Compression Screw/Locking Cap Kit, 4.5 x 46mm, Purple
320-01-36	Glenosphere, 36mm
320-01-38	Glenosphere, 38mm
320-01-42	Glenosphere, 42mm
320-15-05	Glenosphere Locking Screw
320-15-01	Glenoid Plate
320-20-00	Reverse Shoulder, Torque Defining Screw Kit
301-01-07	Broach, 7mm
301-01-09	Broach, 9mm
301-01-11	Broach, 11mm
301-01-13	Broach, 13mm
301-01-15	Broach, 15mm
301-01-17	Broach, 17mm

** Special order*

INSTRUMENT LISTING

CATALOG NO.	PART DESCRIPTION	
301-03-01	Modular Broach Handle	
301-03-10	Retroversion Handle	
301-07-01	Mallet	
301-07-10	Primary Stem Inserter/Extractor	
301-07-20	Stem Protector	
301-07-30	T-Handle	
301-07-50	Screw Drive Handle	
301-07-60	Small Stem Protector	
301-07-70	T-Handle, Short	
301-07-80	Screw Drive Handle,Ratcheting	
301-10-10	Torque Defining Removal Instrument	

INSTRUMENT LISTING

CATALOG NO.	PART DESCRIPTION	
301-10-00	Modular Anatomic Replicator Handle	
301-10-35	Modular Anatomic Replicator Fork	
311-01-01	Anatomic Osteotomy Guide	
311-01-10	132.5 Degree Osteotomy Guide	

The below catalog numbers are available in multiple sizes. To order, replace "XX" with the desired size:

301-15-XX	Straight Reamer, Multiple Sizes	
301-10-XX	Plate Dial, Multiple Sizes	
311-01-XX 311-02-XX 311-03-XX	Short Head Trial, Multiple Sizes Tall Head Trial, Multiple Sizes Expanded Head Trial, Multiple Sizes	
315-25-00	Modular Cannulated TriDrive	
315-27-60	Modular Center Peg/Keel Drill	
315-27-63	Modular Cannulated Center Peg Drill	
317-01-02	Humeral Head Retractor	
317-01-03	Darrach Retractor	

CATALOG NO.	PART DESCRIPTION	
317-01-04	Dual Point Glenoid Retractor	
317-01-05	Single Point Glenoid Retractor	
317-01-06	Hohmann Retractor	
317-01-08	Wolfe Retractor	
317-20-01	Forked (Playboy) Retractor – Small	
317-20-03	Deltoid Retractor	
321-01-07 321-01-09 321-01-11 321-01-13 321-01-15 321-01-17	7mm Humeral Stem Trial 9mm Humeral Stem Trial 11mm Humeral Stem Trial 13mm Humeral Stem Trial 15mm Humeral Stem Trial 17mm Humeral Stem Trial	
321-01-25	Glenosphere Inserter	
321-01-26	Pilot Glenosphere Inserter	
321-01-27	Glenosphere Inserter Slide	
321-01-28	Glenosphere Inserter Spring Handle	
321-01-29	Universal Glenosphere Inserter Clamp	
321-01-31	Klimo Inserter	
321-02-15	Glenosphere Removal Hook	

INSTRUMENT LISTING

CATALOG NO.	PART DESCRIPTION
321-01-38	Glenosphere Trial, 38mm
321-01-42	Glenosphere Trial, 42mm
321-07-05	Impactor Handle
321-07-10	Glenoid Plate Coring Reamer
321-07-38	Humeral Liner Impactor Tip, 38mm
321-07-42	Humeral Liner Impactor Tip, 42mm
321-10-00	Humeral Adapter Tray Trial Assembly, +0
321-10-05	Humeral Adapter Tray Trial Assembly, +5
321-10-11	Humeral Adapter Tray Trial Assembly, +10
321-10-35	Reverse Shoulder Modular Replicator Handle
321-15-04	Adjustable Angle Drill Guide
321-20-00	Drill Bit Kit, 2.0mm and 3.2mm
321-15-08	Hex Screwdriver, 3.5mm
321-15-09	Glenoid Screw Depth Gauge
321-15-11	Humeral Liner Removal Tool

CATALOG NO.	PART DESCRIPTION
321-15-13	Glenoid Plate Inserter/Impactor
321-15-22	Back Table Assembly
321-15-23	Primary Backtable Insert
321-15-30	Modular Glenoid Plate Drill Guide, Superior Lateral, Left
321-15-31	Modular Glenoid Plate Drill Guide, Superior Lateral, Right
321-15-32	Modular Glenoid Plate Drill Guide, Deltopectoral, Left
321-15-33	Modular Glenoid Plate Drill Guide, Deltopectoral, Right
321-25-01	Modular Reverse Pilot-Tip Starter Reamer
321-25-38	Modular Reverse Pilot-Tip Reamer, 38mm
321-25-42	Modular Reverse Pilot-Tip Reamer, 42mm
321-35-01	Modular Reverse Cannulated Starter Reamer
321-35-38	Modular Reverse Cannulated Reamer, 38mm
321-35-42	Modular Reverse Cannulated Reamer, 42mm
321-36-00	Humeral Liner Trial, +0, 36mm
321-36-03	Humeral Liner Trial, +2.5, 36mm
321-36-10	Humeral Liner Trial, Constrained, +0, 36mm
321-36-13	Humeral Liner Trial, Constrained, +2.5, 36mm
321-38-00	Humeral Liner Trial, +0, 38mm
321-38-03	Humeral Liner Trial, +2.5, 38mm
321-38-10	Humeral Liner Trial, Constrained, +0, 38mm
321-38-13	Humeral Liner Trial, Constrained, +2.5, 38mm
321-42-00	Humeral Liner Trial, +0, 42mm
321-42-03	Humeral Liner Trial, +2.5, 42mm
321-42-10	Humeral Liner Trial, Constrained, +0, 42mm
321-42-13	Humeral Liner Trial, Constrained, +2.5, 42mm

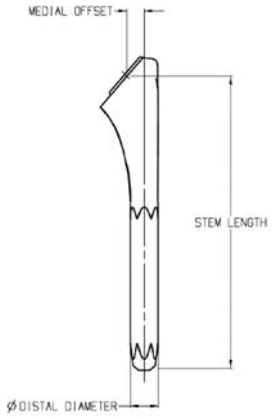
SYSTEM SPECIFICATIONS

(ALL DIMENSIONS IN MILLIMETERS)

HUMERAL STEM

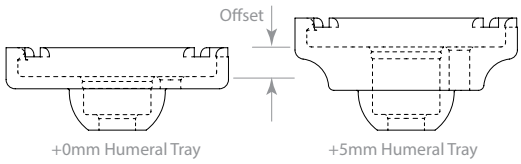
Distal Diameter	Length*	Inherent Medial Offset	Material	Surface Finish		Geometry	
				Proximal	Distal	Proximal	Distal
7	100	7.5	Ti-6Al-4V	16 grade grit blast	Hi-Brite Polish	Trapezoidal	Cylindrical with Flutes
9	105						
11	110	8.5					
13	115	9.5					
15	120						
17	125						

**Measured from distal tip to center of proximal spherical bore*



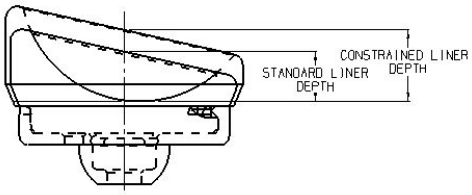
HUMERAL LINER/HUMERAL TRAY OFFSET COMPARISONS

	+0mm Humeral Liners (Standard and Constrained)	+2.5mm Humeral Liners (Standard and Constrained)
+0 Humeral Tray	0	2.5
+5 Humeral Tray	5	7.5
+10 Humeral Tray	10	12.5
+15 Humeral Tray*	15	17.5



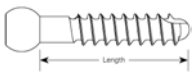
HUMERAL LINER DEPTH COMPARISONS

	Standard Liner Depth (+0mm and +2.5mm)	Constrained Liner Depth (+0mm and +2.5mm)
36 Humeral Liners	8.5	12.0
38 Humeral Liners	8.5	12.0
42 Humeral Liners	8.8	12.6



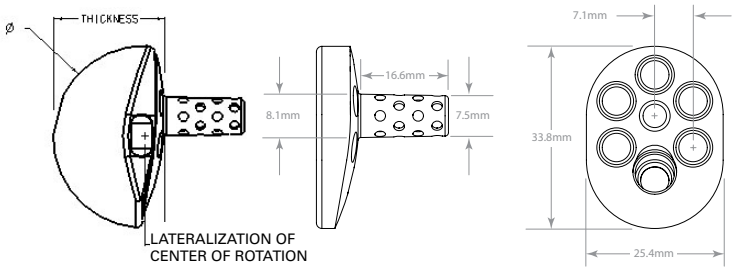
COMPRESSION SCREWS

Outer Diameter	Length	Color
4.5	18	White
	22	Black
	26	Orange
	30	Blue
	34	Red
	38	Green
	42	Yellow
	46	Purple



GLENOSPHERE/GLENOID PLATE

	Diameter	Thickness	Average Lateralization of Center of Rotation
36 Glenosphere	36	22.0	2
38 Glenosphere	38	23.1	
42 Glenosphere	42	25.1	



INDICATIONS FOR USE

REVERSE SHOULDER SYSTEM

INDICATIONS

The Equinoxe Shoulder System is indicated for use in skeletally mature individuals with degenerative diseases or fractures of the glenohumeral joint where total or hemi-arthroplasty is determined by the surgeon to be the preferred method of treatment.

- The cemented primary humeral stem, long/revision stem, fracture stems and all Equinoxe glenoids are intended for cemented fixation.
- The press-fit humeral stems are intended for press-fit applications but may be used with bone cement at the discretion of the surgeon.
- The reverse humeral components are intended to be used in cemented applications or in revision cases when the humeral component is well-fixed/stable, as deemed by the orthopaedic surgeon.
- Humeral Heads are intended for use in cemented and press-fit applications.

Clinical indications for the LONG/REVISION (L/R) and humeral components are as follows:

L/R	Indications
√	Rheumatoid Arthritis, Osteoarthritis, Osteonecrosis Or Post-Traumatic Degenerative Problems
√	Congenital Abnormalities In The Skeletally Mature
	Primary And Secondary Necrosis Of The Humeral Head
	Humeral Head Fracture With Displacement Of The Tuberosities
√	Pathologies Where Arthrodesis Or Resectional Arthroplasty Of The Humeral Head Are Not Acceptable
√	Revisions Of Humeral Prostheses When Other Treatments Or Devices Have Failed (Where Adequate Fixation Can Be Achieved)
	Displaced Three-Part And Four-Part Upper Humeral Fractures
√	Spiral And Other Fractures Of The Mid-Humerus (In Combination With Glenohumeral Degenerative Diseases)
√	Revision Of Failed Previous Reconstructions When Distal Anchorage Is Required
√	To Restore Mobility From Previous Procedures (E.g. Previous Fusion)

The Equinoxe Reverse Shoulder System is indicated for use in skeletally mature individuals with degenerative diseases of the glenohumeral joint and a grossly deficient, irreparable rotator cuff. The Equinoxe Reverse Shoulder is also indicated for a failed glenohumeral joint replacement with loss of rotator cuff function resulting in superior migration of the humeral head.

CONTRAINDICATIONS

Use of the Equinoxe Shoulder System is contraindicated in the following situations:

- Osteomyelitis of the proximal humerus or scapula; if a systemic infection or a secondary remote infection is suspected or confirmed, implantation should be delayed until infection is resolved.
- Inadequate or malformed bone that precludes adequate support or fixation of the prosthesis.
- Neuromuscular disorders that do not allow control of the joint.
- Significant injury to the brachial plexus.
- Non-functional deltoid muscles.
- Patient's age, weight, or activity level would cause the surgeon to expect early failure of the system.
- The patient is unwilling or unable to comply with the post-operative care instructions.
- Alcohol, drug, or other substance abuse.
- Any disease state that could adversely affect the function or longevity of the implant.

REFERENCES

1. **Roche C, et al.** Geometric analysis of the Grammont reverse shoulder prosthesis: an evaluation of the relationship between prosthetic design parameters and clinical failure modes. Proceedings of the 19th Annual Congress of the International Society for Technology in arthroplasty; 2006 Oct 6-9; New York, NY.
2. **Roche C, et al.** An evaluation of the relationships between reverse shoulder design parameters and range of motion, impingement, and stability. *J Shoulder Elbow Surg.* 2009 Sep-Oct; 18(5):734-41.
3. **Roche C, et al.** Effect of varying screw configuration and bone density on reverse shoulder glenoid fixation following cyclic loading. Transactions of the 54th Annual Orthopaedic Research Society Meeting; 2008 Mar 2-5; San Francisco, CA.

NOTES

NOTES

Exactech is proud to have offices and distributors around the globe. For more information about Exactech products available in your country, please visit www.exac.com

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For additional device information, refer to the Exactech Shoulder System–Instructions for Use for a device description, indications, contraindications, precautions and warnings. For further product information, please contact Customer Service, Exactech, Inc., 2320 NW 66th Court, Gainesville, Florida 32653-1630, USA. (352) 377-1140, (800) 392-2832 or FAX (352) 378-2617.

Exactech, as the manufacturer of this device, does not practice medicine, and is not responsible for recommending the appropriate surgical technique for use on a particular patient. These guidelines are intended to be solely informational and each surgeon must evaluate the appropriateness of these guidelines based on his or her personal medical training and experience. Prior to use of this system, the surgeon should refer to the product package insert for comprehensive warnings, precautions, indications for use, contraindications and adverse effects.

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