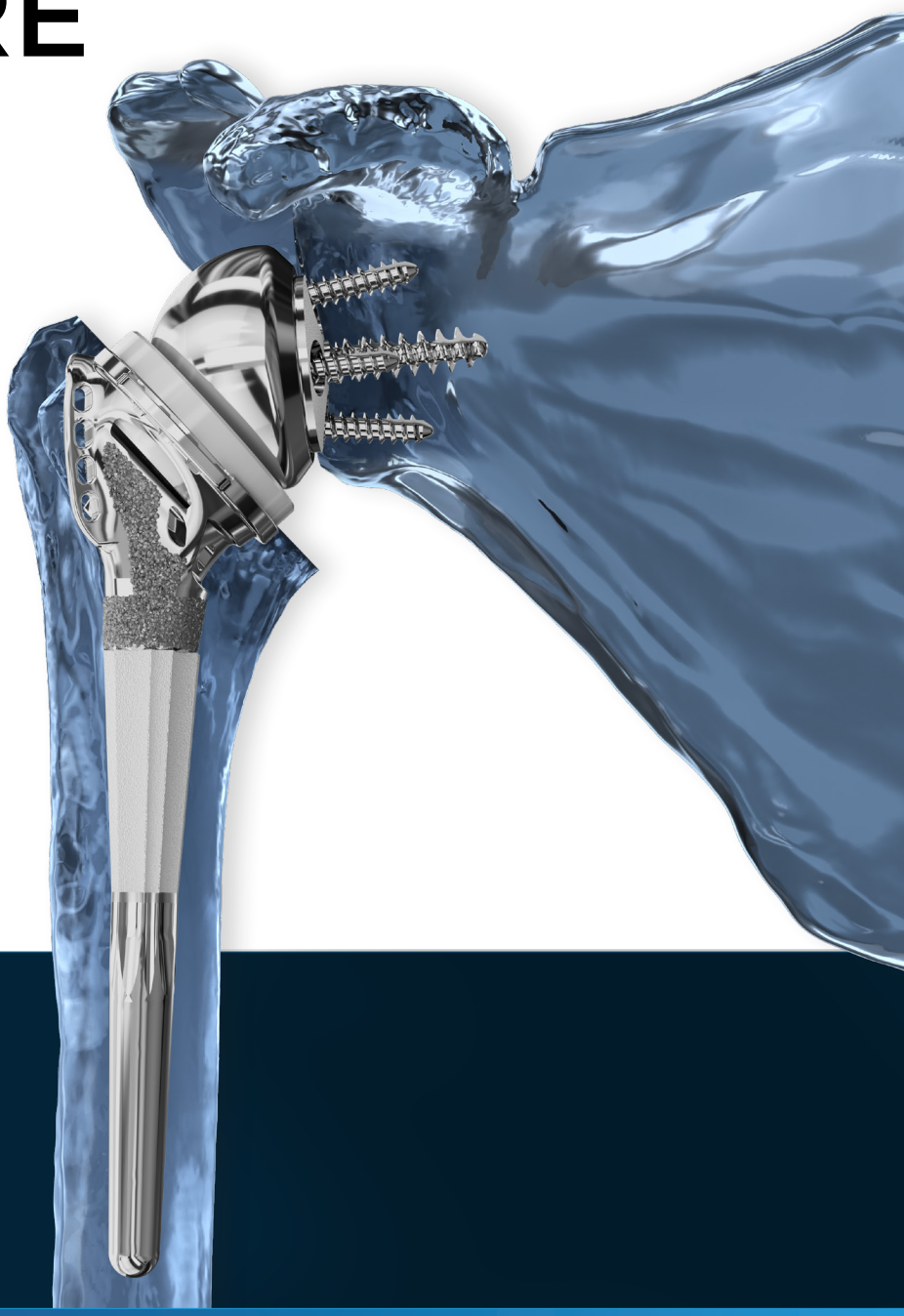
CATALYST FRACTURE SYSTEM

SURGICAL TECHNIQUE



CATALYST
ORTHOSCIENCE®

INTRODUCTION

The Catalyst Fracture Shoulder System is intended for use in patients with proximal humerus fractures. The stems can be used in conjunction with the Catalyst Reverse Shoulder humeral articulating poly inserts and glenoid implants for use in reverse shoulder arthroplasty. The stems can also be used in conjunction with the Catalyst Stemmed Anatomic Shoulder System and CSR System for use in total or hemi-shoulder arthroplasty. The design intent of the Catalyst Fracture Shoulder System is to offer a unique solution for securing and immobilizing the greater and lesser tuberosities in the repair of proximal humerus fractures.

The Catalyst Fracture Shoulder System consists of **proximal bodies, distal stems, locking screws and spacers.** The proximal bodies have asymmetric, **right- and left-sided** finned geometry to provide specific locations to reattach the greater and lesser tuberosities for a **stable reconstruction** of the proximal humerus. The proximal bodies have a **porous titanium** structure on the bone engaging regions to enhance the mechanical fixation. The distal stems are provided in varying diameters to accommodate varying bone geometries. The distal stems are offered in press-fit and cemented versions. The press-fit distal stems have a tapered, splined proximal geometry with an HA (hydroxyapatite) coating. The cemented stems have a smooth stem geometry. The proximal bodies and distal stems shall be secured together using a mechanical taper interface that is supplemented with a locking screw.

INDICATIONS/CONTRAINDICATIONS

Indications for Use

The Catalyst Fracture Shoulder System is intended for use as a replacement of shoulder joints in anatomic or reverse arthroplasty. Should the need arise for a conversion from an anatomic total shoulder to a reverse total shoulder, the humeral stem can remain in place, while the articulating surfaces are exchanged.

Anatomic Total Shoulder or Hemi-Shoulder

The Catalyst Fracture Shoulder System is indicated for use in skeletally mature individuals with degenerative diseases of the glenohumeral joint where hemi- or total shoulder arthroplasty is determined by the surgeon to be the preferred method of treatment. The Catalyst Fracture Shoulder System is intended for use in patients with the following conditions where the humeral head, neck and glenoid vault are of sufficient bone stock and the rotator cuff is intact or reconstructable.

- Osteoarthritis
- Avascular Necrosis
- Rheumatoid Arthritis
- Post-traumatic Arthritis
- Correction of functional deformity

Reverse Total Shoulder

The Catalyst Fracture Shoulder System is a reverse total shoulder replacement for patients with a functional deltoid muscle and a grossly deficient rotator cuff joint suffering from pain and dysfunction due to:

- Severe arthropathy with a grossly deficient rotator cuff;
- Previously failed joint replacement with a grossly deficient rotator cuff;
- Fracture of glenohumeral joint from trauma or pathologic conditions of the shoulder including humeral head fracture, displaced 3- or 4-part fractures of proximal humerus, or reconstruction after tumor resection;
- Non-inflammatory degenerative disease including osteoarthritis and avascular necrosis of the natural humeral head and/or glenoid;
- Inflammatory arthritis including rheumatoid arthritis;
- Correction of functional deformity

Catalyst Fracture press-fit stems are intended for cementless press-fit applications.

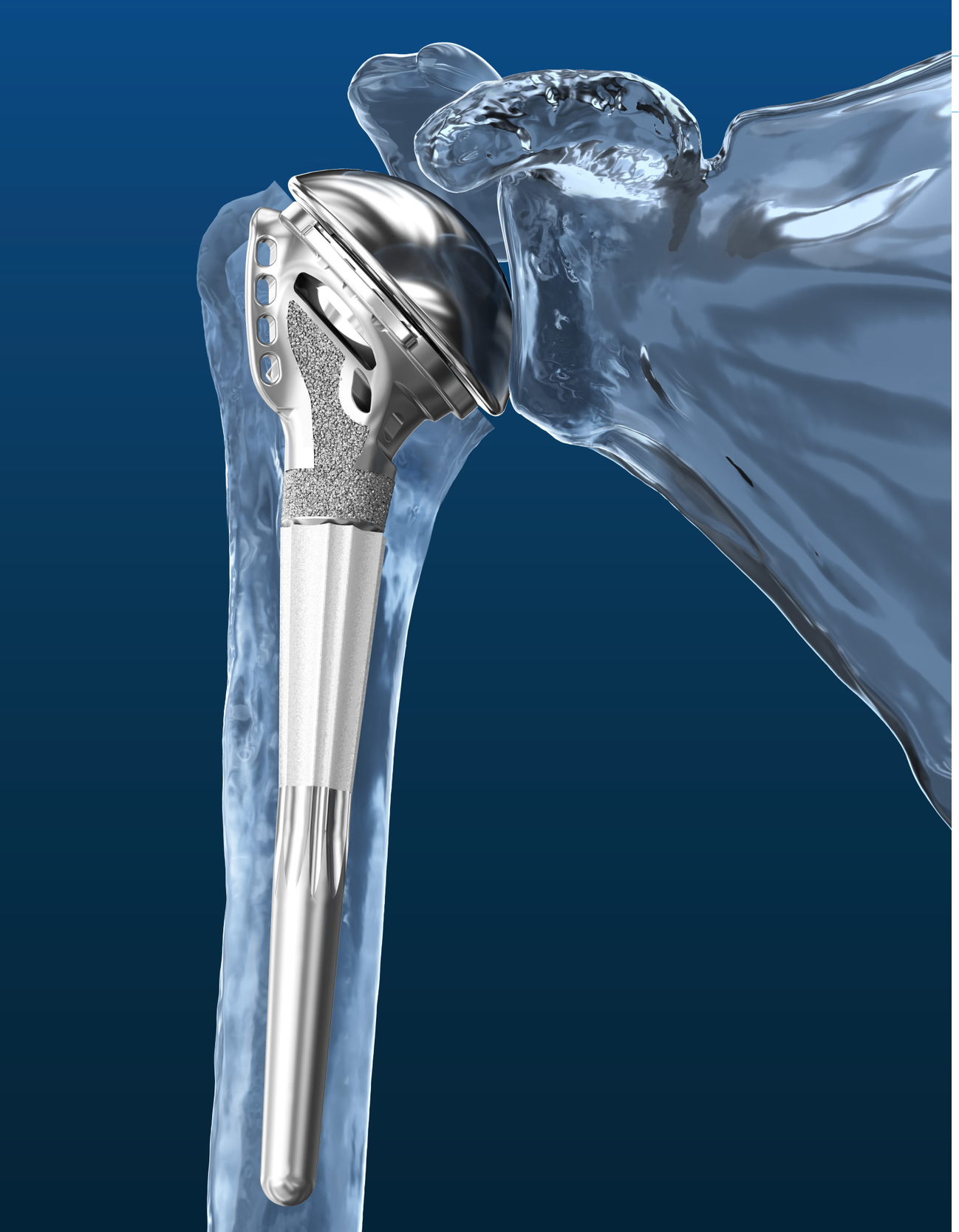
The Catalyst Fracture cemented stems are intended for cemented fixation.

The Catalyst Fracture stem is compatible with the implants from the Catalyst CSR System, Catalyst Stemmed Anatomic Shoulder System and Reverse Shoulder Systems.

Contraindications

Use of the Catalyst Fracture Shoulder System is contraindicated in the following conditions:

- Non-functional deltoid muscle
- Local or systemic infection, or osteomyelitis of the proximal humerus or scapula; if a systemic infection or a secondary remote infection is suspected or confirmed, joint replacement surgery 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
- Chronic instability or deficient soft tissues and other support structures (e.g., brachial plexus)
- Vascular insufficiency
- Patient's age, weight or activity level 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, substance abuse or other conditions that would affect or impair the patient from complying with post-operative instructions.
- Patients with known sensitivity to Co-Cr-Mo alloys typically used in prosthetic devices
- Any disease that could adversely affect the function or expected longevity of the implants (e.g., metabolic disorders).



SURGICAL TECHNIQUE

PREOPERATIVE POSITIONING

The patient is placed into a semi-reclined beach-chair position or semi-Fowler position on the operating table, with the patient's head secured in a headrest. In the surgeon's experience, a small folded towel is placed behind the medial border of the scapula of the operative side, which has the effect of improving the position of the glenoid intra-operatively. Standard sterile skin preparation and draping are done to isolate the sterile field. The operative arm is placed free on a padded Mayo stand (this surgeon's preference) but alternatively may be secured to an arm holder.

APPROACH & EXPOSURE

A standard deltopectoral incision is made beginning just above the coracoid process, extending inferolaterally to the anterior arm, just below the level of the axillary fold. The surgeon dissects the interval between the pectoralis major medially and the deltoid laterally, usually taking the cephalic vein laterally with the deltoid. A narrow yellow fat stripe in line with the muscle fibers serves as a landmark to identify the location of the cephalic vein and deltopectoral interval. A Richardson retractor is used to retract the pectoralis medially and a deltoid retractor is used to retract the deltoid and cephalic vein laterally.

ANATOMIC ORIENTATION

The normal proximal humeral anatomy is usually disrupted in the setting of a fracture. Identifying the biceps tendon distally at or just above the level of the pectoralis insertion can provide a landmark to direct the surgeon to the other anatomic structures. Blunt finger dissection can be helpful in defining the interval between the strap muscles and the humerus. A self-retaining retractor is then placed deep to the strap muscles and the deltoid to provide exposure of the humerus.

FRACTURE IDENTIFICATION

Moving distal to proximal; the fracture fragments at the neck of the humerus can be identified by gently rotating the humerus. Palpation of the fragments will frequently identify the bicipital groove on the lesser tuberosity which can serve as an additional landmark. A cobb elevator or other blunt instrument can then be used to carefully define the individual fracture fragments and separate them from encasing scar tissue. Of note, the fracture line between the greater and lesser tuberosity fragments is frequently lateral to the bicipital groove. A preoperative CT scan can help determine the exact location of the fracture lines.

FRAGMENT CONTROL & PREPARATION

Once the greater and lesser fragments are well defined, tagging sutures are then placed at the tendinous junction to provide control of the two fragments. The two tuberosity fragments are then retracted which will reveal the humeral head impacted on the shaft. The head fragment is disimpacted off the shaft and then placed on the back table to be used as bone graft if needed.

CANAL PREPARATION

Scar tissue and impacted bone from the canal can then be removed. Homan retractors placed around the humeral shaft can be helpful to deliver the humerus anteriorly to allow removal of any residual debris.

REVERSE GLENOID PROCEDURE

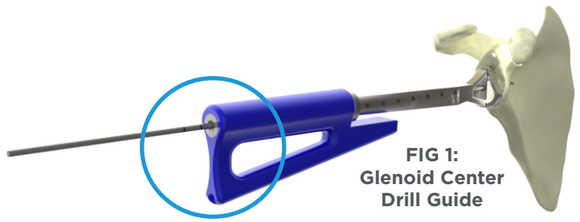


FIG 1:
Glenoid Center
Drill Guide

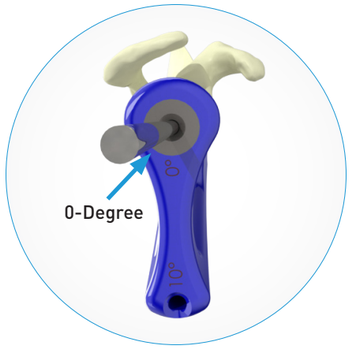


FIG 2:
0° Hole

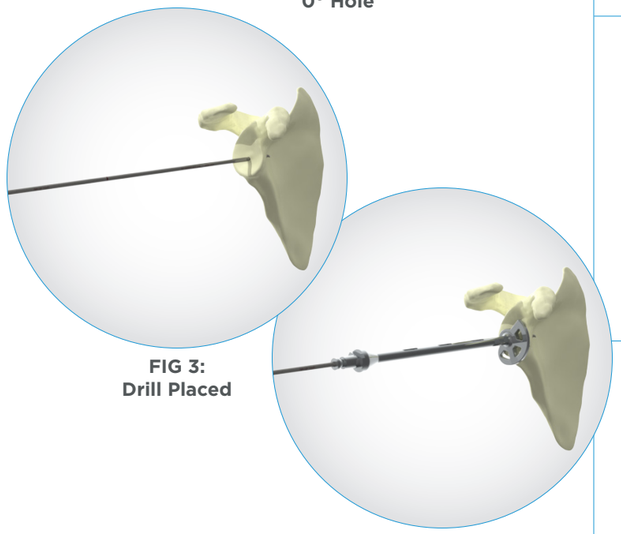


FIG 3:
Drill Placed

FIG 4:
Standard Glenoid
Reamer

BASEPLATE REAMING

The surgeon has the option of placing a standard baseplate, a lateralized baseplate or a 10-degree augmented baseplate.

OPTION 1: PLACEMENT OF STANDARD OR LATERALIZED BASEPLATE

Step 1. Place Center Pin

The baseplate template of the glenoid central drill guide is placed against the face of the glenoid with the inferior portion of the guide against the inferior rim of the glenoid. **[FIG 1]**

Holding the guide in place, the 3mm drill is passed through the **0-degree hole** and drilled into the glenoid bone **[FIG 2]**, until the surgeon feels the drill exiting out the anterior scapula. Laser markings on the drill determine the appropriate central screw length or post length to be placed. The guide is then removed, and the drill remains in position. **[FIG 3]**

Step 2A. Glenoid Reaming

The **standard** cannulated glenoid reamer is advanced over the drill, and the face of the glenoid is reamed under power until the surgeon visualizes bleeding subchondral bone. **[FIG 4]**

Tip: Begin reaming prior to making contact with the reamer on the face of the glenoid. Starting the reamer while seated against bone increases the risk of fracture.

Step 2B. Boss Trephine (Lateralized Baseplates only)

If a lateralized baseplate with boss is used, then the surgeon uses the baseplate trephine over the 3mm drill and drills to the depth stop on the trephine. The trephine is removed and standard preparation for the central screw or post is followed as described below.

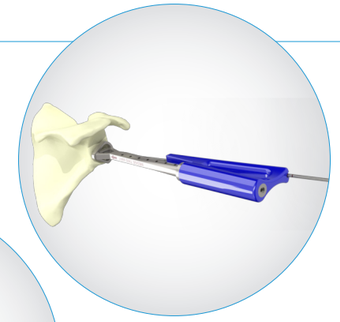


FIG 5A:
Posterior Augment,
Center Drill Guide

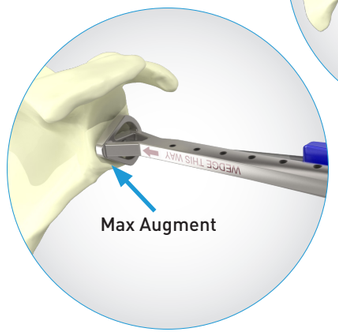


FIG 5B:
Center Drill
Guide Positioning

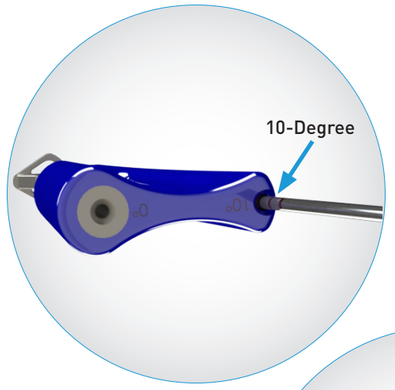


FIG 6:
10° hole

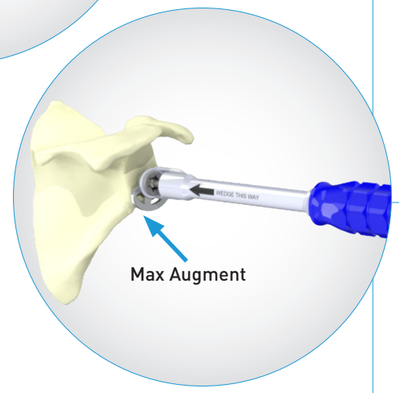


FIG 7:
Augmented Reamer

OPTION 2: PLACEMENT OF 10-DEGREE AUGMENTED BASEPLATE

Step 1. Place Center Pin

The baseplate template is placed against the face of the glenoid with the superior apex oriented in the direction of maximum augmentation.
[FIG 5A & 5B] The 3mm drill is passed through the guide via the **10-degree hole** and drilled into the glenoid bone **[FIG 6]**, until the surgeon feels the drill exiting out the anterior scapula. Laser markings on the drill determine the appropriate central screw length or post length to be placed.

The guide is then removed, and the drill remains in position.

Step 2A. Glenoid Reaming

The **augmented** cannulated glenoid reamer is advanced over the drill, with the arrow on the reamer shaft oriented in the direction of maximum augmentation **[FIG 7]** and the face of the glenoid is reamed under power until the surgeon visualizes bleeding subchondral bone.

Tip: Begin reaming prior to making contact with the reamer on the face of the glenoid. Starting the reamer while seated against bone increases the risk of fracture.

Step 2B. Boss Trephine (Augmented Boss Baseplate only)

If the augmented baseplate with boss is used, then the surgeon uses the baseplate trephine over the 3mm drill and drills to the depth stop on the trephine. The trephine is removed and standard preparation for the central screw or post is followed as described below.

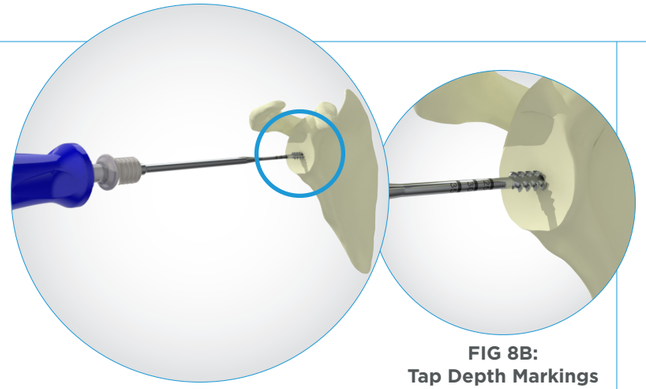


FIG 8A:
Central Screw Tap

FIG 8B:
Tap Depth Markings

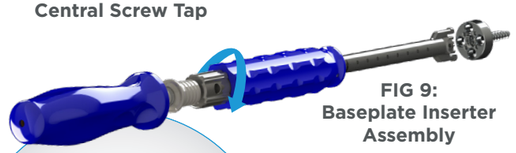


FIG 9:
Baseplate Inserter Assembly

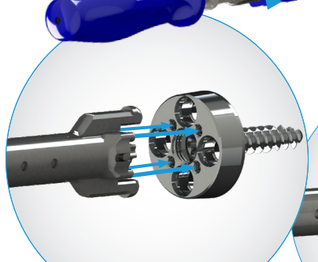


FIG 10:
Connect to Baseplate

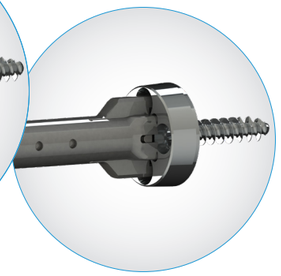


FIG 11:
Assembled Baseplate

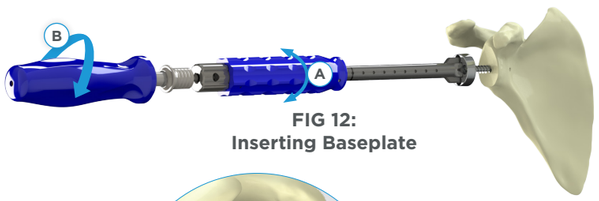


FIG 12:
Inserting Baseplate

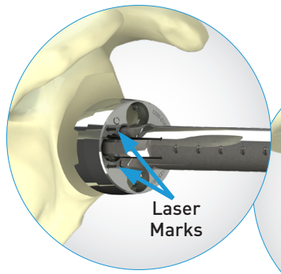


FIG 13:
Augmented Baseplate

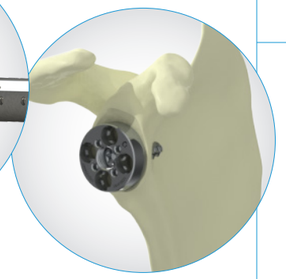


FIG 14:
Fully Seated Baseplate

Step 3. Insert Baseplate

All the baseplates are designed to accommodate either a 6.5mm centralized bone screw or a 6.5mm porous titanium plasma-sprayed centralized post, along with 4 locking 4.5mm peripheral bone screws. The 6.5mm screw is available in lengths of 25, 30 and 35mm and the 6.5mm post is available in lengths of 25 and 35mm.

OPTION 1: INSERTION OF BASEPLATE WITH 6.5MM CENTRAL SCREW

The 3mm drill is removed from the glenoid and the hole is tapped using the center screw tap to the desired depth. **[FIG 8A & 8B]**

The selected baseplate and screw of desired length are assembled together and placed onto the baseplate inserter. **[FIG 9]** Align the 4 orientation pegs of the inserter with the 4 small holes on the baseplate, and the two large pegs with two of the peripheral screw holes **[FIG 10]**, then rotate the knob on the proximal end of the inserter to lock the baseplate flush against the inserter. **[FIG 11]**

The 6.5mm central screw is threaded into bone. The blue handle **[FIG 12A]** on the baseplate inserter allows for rotational control of the peripheral screw positions. The screw is then driven into the bone with the Quick Connect Silicone Handle. **[FIG 12B]**

If an augmented baseplate is used, the baseplate is rotated so the laser marking of maximum augment height is rotated into optimal position. **[FIG 13]**

Once the screw is tight and the baseplate is firmly seated against bone, the inserter is then released from the baseplate by unthreading the proximal knob of the baseplate inserter. **[FIG 14]**

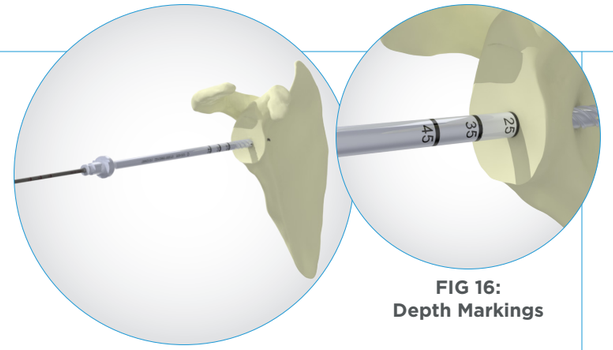


FIG 15:
Center Post Trephine

FIG 16:
Depth Markings

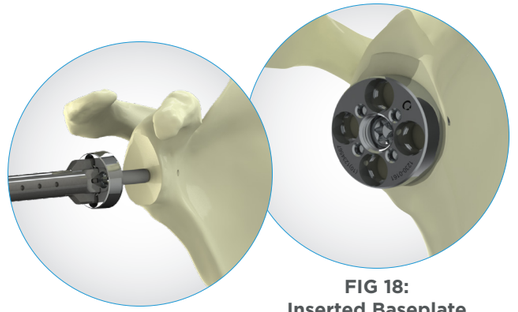


FIG 17:
Baseplate with Post Option

FIG 18:
Inserted Baseplate

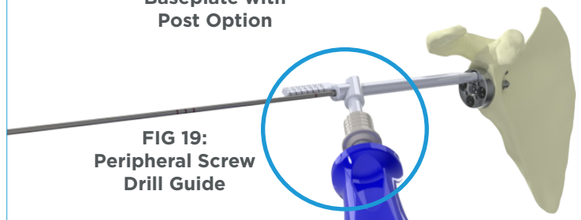


FIG 19:
Peripheral Screw Drill Guide

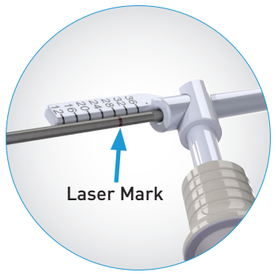


FIG 20:
Depth Markings

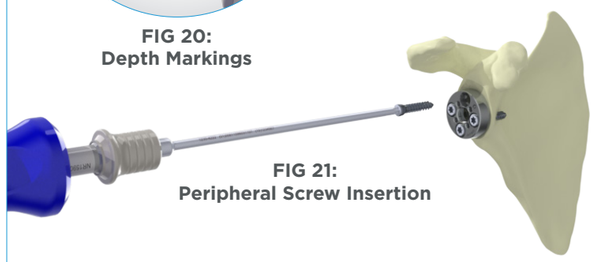


FIG 21:
Peripheral Screw Insertion

OPTION 2: INSERTION OF BASEPLATE WITH CENTRAL POST

The surgeon uses the cannulated center post trephine over the 3mm drill **[FIG 15]** and drills to the depth of the selected post. **[FIG 16]** Both the drill and trephine are then removed.

The selected baseplate and post of desired length are assembled together and placed onto the baseplate inserter **[FIG 17]**

Note: the locking cap can be pre-assembled onto the baseplate at this step before attaching the inserter.

The blue handle on the baseplate inserter allows for rotational control of the peripheral screw positions. If an augmented baseplate is used, the baseplate is rotated so the laser marking of maximum augment height is rotated into optimal position. The surgeon taps the proximal end of the baseplate inserter with a mallet to advance the post until the baseplate is firmly seated against bone. **[FIG 18]** The inserter is then released from the baseplate by unthreading the proximal knob on the baseplate inserter.

Step 4. Peripheral Screws

The peripheral drill guide is placed into one of the peripheral drill holes and drilled with the 3mm drill in bicortical fashion. **[FIG 19]** The length of the peripheral screw is determined by depth markings on the drill. **[FIG 20]**

A depth gauge may also be used to measure for screw depth. The peripheral screws are then screwed into position with the small screwdriver until the locking feature is engaged and/or the compression screw can no longer be advanced. **[FIG 21]**

Four peripheral locking or compression screws are recommended, but a minimum of 2 screws should be used in the baseplate of at least 24mm length. If bone stock is available, superior and inferior screw locations are preferable for maximizing implant security.

FIG 22A:
Locking Cap Insertion

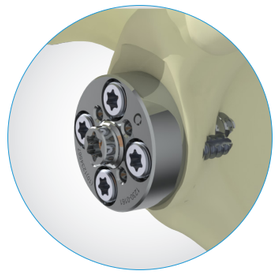


FIG 22B:
Fully Seated Locking Cap

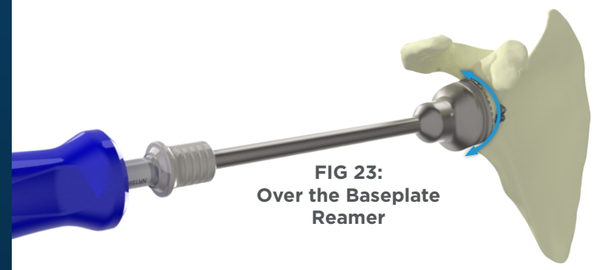


FIG 23:
Over the Baseplate
Reamer

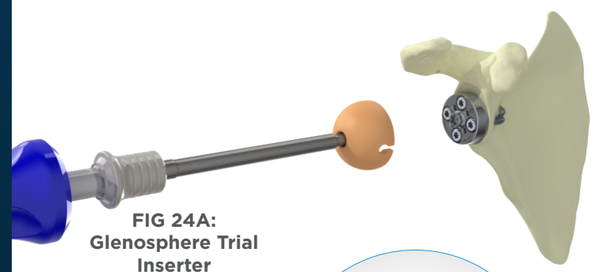


FIG 24A:
Glenosphere Trial
Inserter

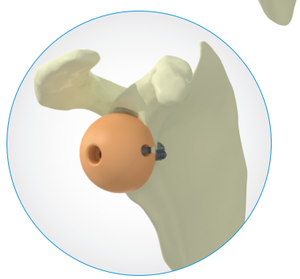


FIG 24B:
Seated Glenosphere Trial

Step 5. Place Locking Cap

The locking cap is seated onto the central screw or peg with the large screwdriver. **[FIG 22A & 22B]**

Tip: Before fastening locking cap, central screw can be checked for tightness.

Step 6. Glenosphere Trialing

The surgeon is now ready for glenosphere trialing. The over the baseplate reamer is used to remove additional bone and tissue peripherally to ensure adequate seating of the glenosphere. **[FIG 23]**

The glenosphere trial is threaded onto the glenosphere inserter and positioned onto the baseplate. **[FIG 24A & 24B]**

The glenosphere trial is then removed.

Step 7. Place Final Glenosphere

The final glenosphere implant is threaded onto the glenosphere inserter and positioned onto the baseplate. **[FIG 25]** The inserter can be lightly malleted to seat the taper lock mechanism.

The inserter is then unthreaded, and the glenosphere impactor is placed onto the glenosphere for final impaction with a mallet. **[FIG 26]** The glenosphere locking screw is then inserted with the small screwdriver to ensure the glenosphere is locked into position. **[FIG 27A & 27B]**

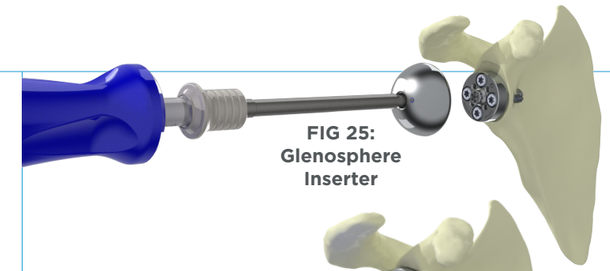


FIG 25:
Glenosphere
Inserter

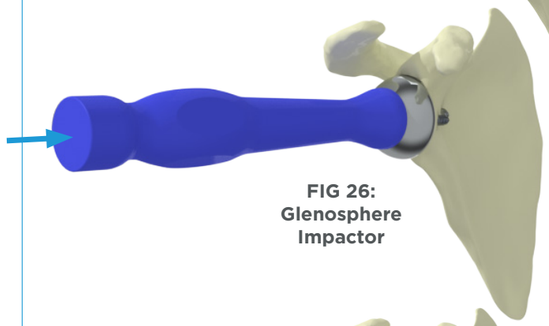


FIG 26:
Glenosphere
Impactor

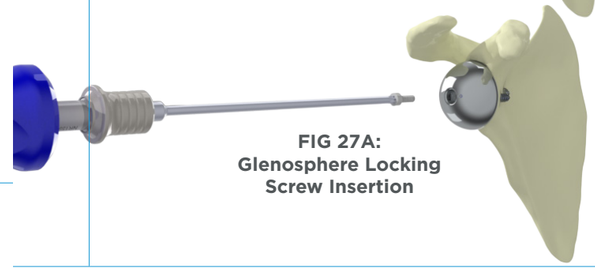


FIG 27A:
Glenosphere Locking
Screw Insertion

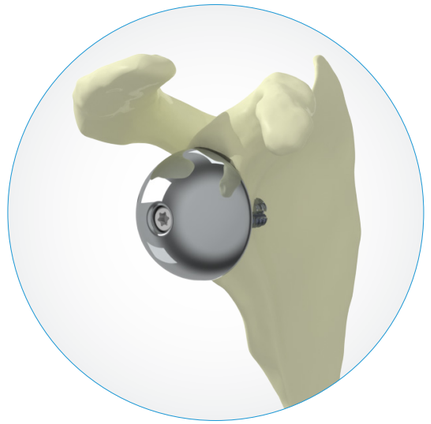


FIG 27B:
Final Implant

REVERSE GLENOSPHERE & BASEPLATE COMPATIBILITY

The glenoid components lateralization options are provided for the surgeon to balance the joint tension intraoperatively. Due to patient selection, there may be benefits to lateralizing the baseplate or using a more lateralized glenosphere. Not all glenospheres are recommended for use with the +4 lateralized baseplate. The chart below notes which combination of glenospheres and baseplates are recommended.

GLENOSPHERE	STANDARD BASEPLATE	AUGMENTED BASEPLATES*	+2 LATERALIZED BASEPLATE	+4 LATERALIZED BASEPLATE
32 STD				
32 LAT				
36 STD				
36 LAT				
36 XLT				
40 STD				
40 LAT				
40 XLT				

*Includes boss and non-boss versions.

Acceptable Not recommended

HUMERAL PREPARATION

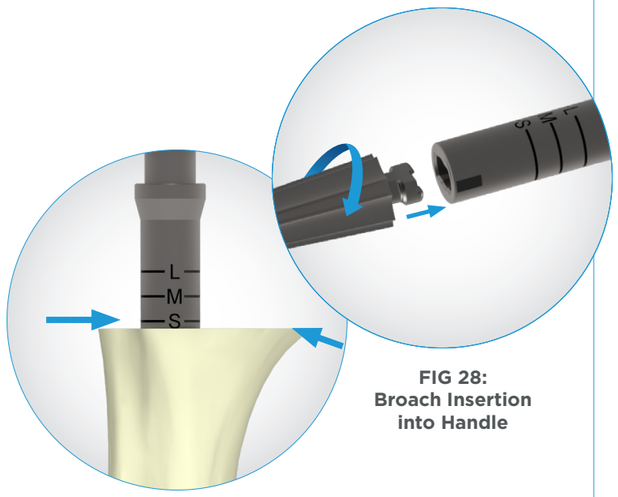


FIG 28:
Broach Insertion into Handle

FIG 29:
Determination of Proximal Body Size

FIG 30

FIG 31A:
Proximal Body Trial Inserted and Connected to the Broach

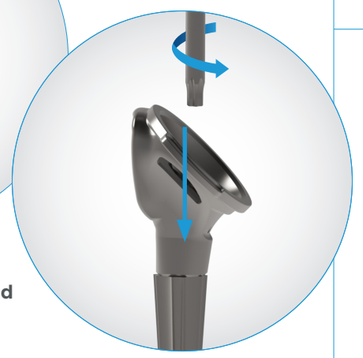


FIG 31B:
Proximal Body Trial Inserted and Connected to the Broach

Step 1. Distal Preparation – Sizing the Canal

Assemble the broach into the broach handle by inserting the broach into the open end of the handle and then twisting the broach until it locks in place. **[FIG 28]**

Sequentially trial the broaches with minimal impaction with a mallet until secure contact is made with the cortical wall of the canal and rotational stability is achieved. Take note of the markings on the broach handle which correspond to the location of the inferior edge of the proximal body cup. The markings on the broach handle that align with the location of the medial calcar will identify the appropriate size of the proximal body. **[FIG 29]**

Note: The small, medium, and large proximal bodies have 0mm, 5mm, and 10mm height offset, respectively, and are right- and left- side specific.

Alternatively, if the medial calcar is not present, the ruler can be used to assess the final implant location relative to the Pectoralis Major tendon proximal insertion site. **[FIG 30]**

> *Per Torrens et al (JSES 2008), the mean distance from the pectoralis major insertion to the tangent to the humeral head is 56mm.*

Once the selected broach is determined, the broach should be removed from the humerus and the broach is then disconnected from the broach handle.

To disconnect the broach from the handle, engage the release trigger on the handle and twist. Then pull the broach out from the handle.

Step 2. Proximal Body Trialing

The selected proximal body trial is inserted onto the broach and secured to the broach by tightening the pre-loaded locking screw using the T25 screwdriver. **[FIG 31A & 31B]**

The assembled trial construct is the inserted back into the humerus using the stem inserter and version rod. The surgeon may choose to trial the polyethylene insert at this time or do so after final stem insertion.

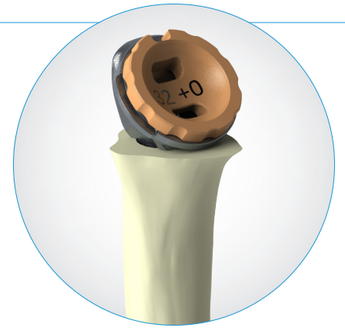


FIG 32:
Seated Trial

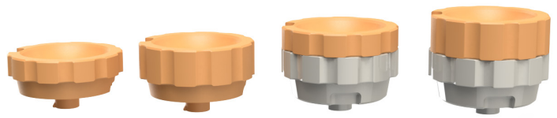


FIG 33:
Trial Sizing +0, +4, +8 and +12

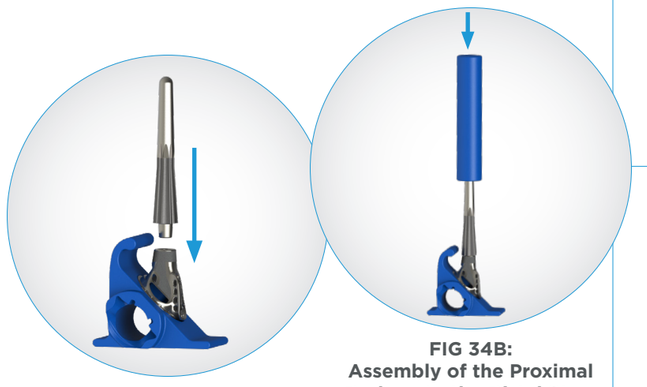


FIG 34A:
Assembly of the Proximal Body onto the Distal Stem

FIG 34B:
Assembly of the Proximal Body onto the Distal Stem

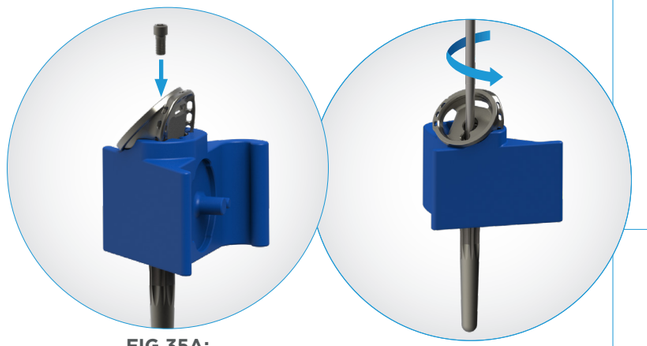


FIG 35A:
Inserting and Tightening the Locking Screw

FIG 35B:
Inserting and Tightening the Locking Screw

Step 3. Reverse Polyethylene Trialing

The surgeon has the option of using a polyethylene insert in 4mm increments of thickness to optimize stability of the glenohumeral joint. Initially, the +0mm polyethylene trial matching the chosen glenosphere size is placed into the humerus broach and twisted to lock into position **[FIG 32]** and the shoulder is reduced, checked for stability and taken through a range of motion.

If the shoulder is loose, the surgeon can exchange to the +4mm polyethylene trial of the chosen glenosphere size and check again for stability. If the shoulder remains loose, the +4mm trial is removed and the surgeon can add the +8mm spacer to the +0 trial for a total of 8mm of additional tension, or combine the +8mm spacer with the +4 trial for a total of 12mm of additional tension. **[FIG 33]**

After trialing, the polyethylene insert is removed, and the Proximal Body and Broach are removed together with the stem inserter before final implant insertion.

Step 4. Final Construct Assembly

The chosen proximal body implant is placed in an inverted orientation on the assembly block, and the male taper of the chosen distal stem is inserted into the female taper on the proximal body. The impactor is then impacted with a mallet to seat the taper lock mechanism. **[FIG 34A & 34B]**

The distal stem of the assembled construct is then inserted into the side of the assembly block, and the proximal body is appropriately oriented in the cutouts of the assembly block. The locking screw is then inserted into the proximal body and tightened using the T25 screwdriver. The assembly block can be used as a counter torque mechanism during screw tightening. **[FIG 35A & 35B]**

FIG 36:
Version Alignment Pin

Step 5. Initial Suture Placement

Prior to placement of the stem, the posterior and superior tuberosity fixation rails are loaded with heavy nonabsorbable #2 sutures or tape. Two or three posterior sutures and one superior suture are placed through the suture holes in a horizontal mattress fashion. Traction is then placed on the greater tuberosity using the previously placed traction suture to expose the undersurface of the greater tuberosity and allow ease of suture passage. This is facilitated by performing this step prior to placement of the prosthesis down the humeral canal.

Using a large needle, each individual suture is placed through the tendinous junction of the greater tuberosity either posteriorly or superiorly depending on the location of the fracture and surgeon preference. The stem is then impacted down the canal with the sutures untied.

Step 6. Stem Implantation

The version alignment pin can be attached proximally to the stem inserter to align the version angle to 10, 20 or 30 degrees. **[FIG 36]** The stem inserter is connected to the assembled implant stem, and the stem is lightly malleted into the humerus until rotational stability is confirmed. The proximal body should replicate its location from the trialing step.

Step 7. Polyethylene Insert Trialing and Implantation

Polyethylene insert trialing should take place with the final humeral implant in place in order to allow the surgeon to choose the polyethylene insert that maintains the shoulder in proper tension, as described in Step 3 above.

If the 8 or 12mm humeral spacer is needed, insert the Humeral Spacer into the socket of the proximal body and align the anti-rotation tab so the Humeral Spacer sits flush to the socket in the proximal body. Insert and tighten the Humeral Spacer Screw.

The selected final polyethylene implant insert is placed into the proximal body with the anti-rotation tab and offset post properly oriented in the stem. Prior to impaction, the appropriate

FIG 37:
Anti-Rotation Tab

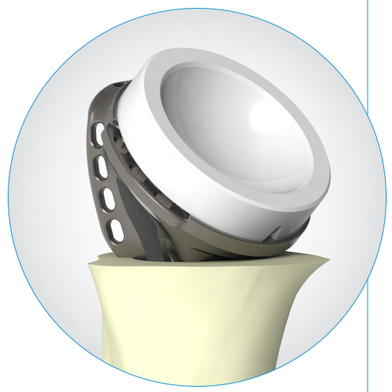


FIG 38:
Fully Seated Poly Insert

orientation can be confirmed if the poly insert is unable to twist in place. **[FIG 37]**

Note: In the cases of extreme instability, semi-constrained poly inserts are available, which capture more of the glenosphere and have polyethylene walls which are 1.2–1.5mm higher than the standard poly inserts, but do not add any additional joint space.

The insert is impacted into the humeral cup with a mallet and the glenosphere impactor coupled with the appropriately sized glenosphere trial. Confirm complete 360-degree seating of the insert on the rim of the proximal body. **[FIG 38]** The glenohumeral joint is then reduced.

Step 8. Fixation of the Tuberosities

Once the final polyethylene has been placed and appropriate tension and range-of-motion achieved, suturing of the tuberosities can occur. Beginning with the posterior sutures, each strand of suture is then brought anteriorly and placed through the anterior retention rail suture holes. Provisional tension on both the posterior and superior sutures can be placed to determine the effect of each suture on the location of the tuberosity. Ideally the tuberosity should be in contact with and compressed to the humeral shaft. These sutures are secured with a clamp for eventual tying. Two mattress sutures are then placed through the anterior suture holes for fixation of the lesser tuberosity. Traction is placed on the lesser tuberosity via the previously placed traction suture and the two mattress sutures are passed. Tension on the sutures will reduce the tuberosity under the neck of the humerus. It may be necessary to debulk the lesser tuberosity with a rongeur. These four strands of suture are then placed through the anterior tuberosity retention rail. The greater tuberosity sutures are then tied over the anterior tuberosity rail to fix the GT to the humeral shaft and posterior prosthesis. If lesser tuberosity fixation is performed, then the anterior LT sutures are subsequently tied over the anterior rail compressing the LT to the humeral shaft and the stem. The shoulder is then put through a gentle range of motion to assure that adequate fixation has been achieved.

Subcutaneous and skin closure are completed per surgeon preference for shoulder arthroplasty. After surgery, pendulum exercises and wrist and hand range of motion exercises can begin immediately. A sling is recommended for four weeks. Formal physical therapy is recommended and can be home directed or performed in a supervised setting. The structured program is typically started one to two weeks after surgery.

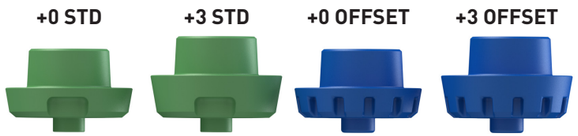


FIG 39:
Adapter Trials

FIG 40A:
Secured Trial Adapter in Broach

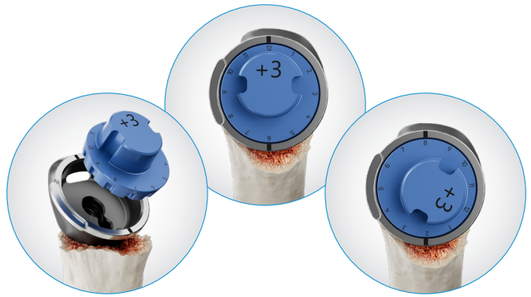


FIG 40B:
Inserting Offset Trial Adapters and Noting Position

FIG 41:
Secured Trial Using Posterior/Anterior Orientation Marks

Step 3. Hemi Component Trialing and Positioning

The initial size of the trial humeral head can be determined by mimicking the fractured head, except in the case of severe deformity. This can be accomplished by placing the fractured head against a trial head and determining which size trial head most closely represents the fractured head.

Each of the head adapters are available in a +3mm option to create an additional 3mm of head height if necessary. **[FIG 39]**

An offset adapter is also available which allows for the humeral head to be placed 2.5mm eccentrically from the center position of the humeral stem. The orientation number of the offset adapter should be noted to correspond with final placement of the adapter implant. **[FIG 40B]**

The adapters are placed into the proximal body trial, and the trial heads are placed, making sure to note the proper orientation of the non-spherical humeral head trials using the laser marks to indicate the Superior and Inferior edges if the head. **[FIG 41]**

If applicable, the Catalyst 3-Peg Glenoid implant trials can be inserted into the prepared glenoid for trialing with the humeral head trials

FIG 42:
Secure Head Adapter with Locking Screw into Stem

FIG 43:
Use Noted Position from Trial for Eccentric Position of Offset Adapter

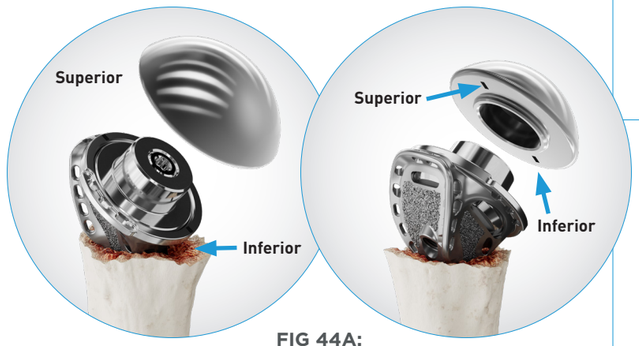


FIG 44A:
Position Humeral Head Implant Using Laser Marks for Orientation

FIG 44B:
Impact Humeral Head to Fully Seat

Step 4. Adapter and Head Implantation - Anatomic or Hemi

The head adapter is oriented into the proximal body and secured in position with the locking screw. Hand tighten the locking screw. (a minimum of 5 Nm is recommended) If the offset adapter is used, the adapter should be positioned in the same orientation as determined from the trialing step. **[FIG 43]**

The Ellipsoid Humeral Head is then positioned onto the adapter and malleted using the impactor to seat the taper lock mechanism. Care should be taken to orient the non-spherical humeral head in the appropriate orientation. Laser marks on the underside of the humeral head indicate the Superior and Inferior edges of the head. **[FIG 44A & 44B]**

ADDITIONAL INFORMATION

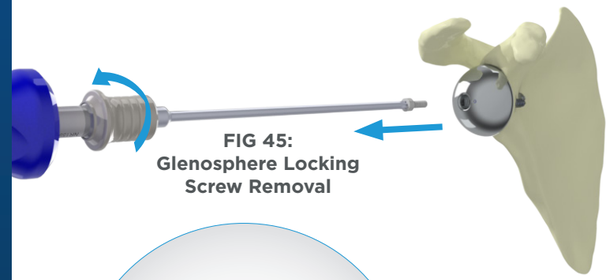


FIG 45:
Glenosphere Locking Screw Removal

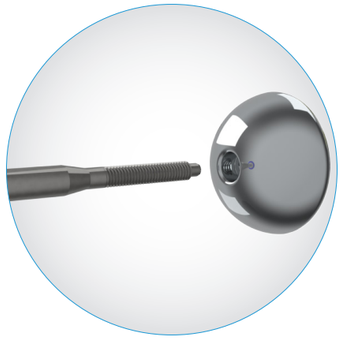


FIG 46A:
Morse Taper Disassembly Tool

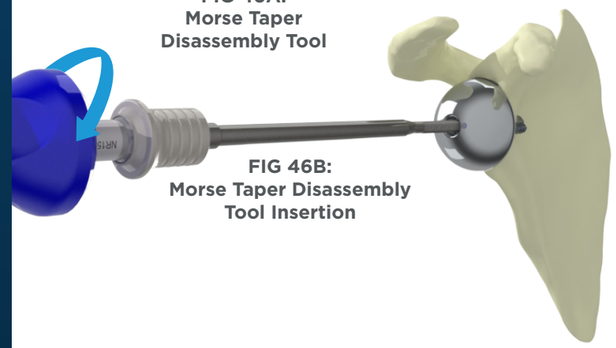


FIG 46B:
Morse Taper Disassembly Tool Insertion

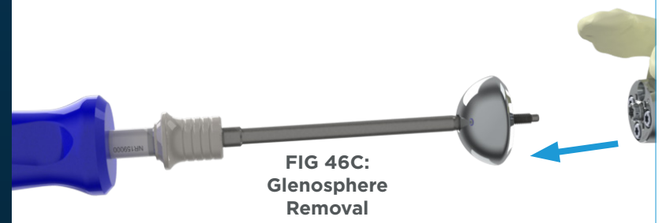


FIG 46C:
Glenosphere Removal

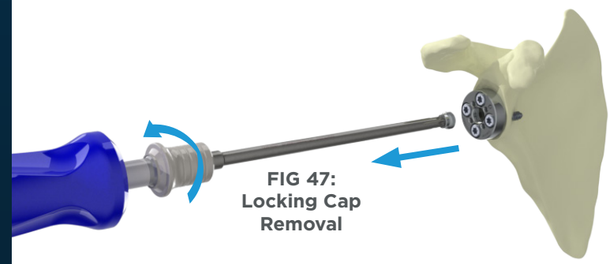


FIG 47:
Locking Cap Removal

REMOVAL OF PROSTHESES

Removal of Glenosphere and Baseplate

Using the small screwdriver, the glenosphere locking screw is removed. **[FIG 45]**

The threaded morse taper disassembly tool is then inserted into the glenosphere threads and rotated clockwise until the tool disengages the morse taper, **[FIG 46A, 46B & 46C]** at which point the glenosphere can be easily removed.

The locking cap in the center of the baseplate is removed with the large screwdriver. **[FIG 47]**

The small screwdriver is then used to remove the peripheral locking screws. **[FIG 48]**

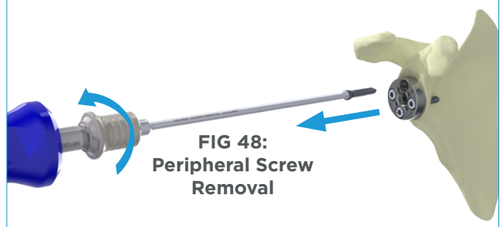


FIG 48:
Peripheral Screw Removal

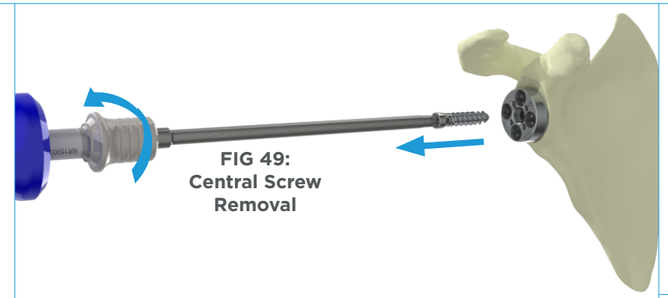


FIG 49:
Central Screw Removal

FIG 50:
Central Post Removal

Removal of a Baseplate with Central Screw Fixation

The large screwdriver is inserted into the center of the baseplate and turned counterclockwise until the central screw is removed. **[FIG 49]** The baseplate can then be removed with an osteotome underneath the side of the baseplate.

Removal of a Baseplate with Central Porous-Coated Peg Fixation

The large screwdriver is inserted into the center of the baseplate and turned in any direction to loosen the central peg from its bony attachments. Once freed, the baseplate inserter is attached to the baseplate and both the baseplate and central peg are removed together. **[FIG 50]** If necessary, the baseplate may be freed from the glenoid bone surface with an osteotome before baseplate extraction.

Removal of Stem and Proximal Body

Removal of the proximal body: Previously placed sutures should be removed from the prosthesis to fully free it prior to removal. A small flexible osteotome can be used proximally around any residual bone to clear the ingrowth surfaces of the proximal body. In the case of a loose humeral stem, the proximal body can be removed in block with splined humeral stem by applying the insertion handle and back-slapping the prosthesis proximally to remove it from the humeral canal.

In the case of a well-fixed humeral stem, it may be necessary to remove the proximal body to access the splined stem. In which case, a T25 screwdriver is used to remove the proximal retention screw from the body. The proximal body removal tool is then threaded into the proximal body until the proximal body is released from the distal stem.

Removal of the splined stem: Once the proximal body has been removed it is possible to place a small flexible osteotome around the splines of the stem to gently free up their attachment from the humerus. K-wires can also be drilled down the humeral canal between the splines of the stem to break the connection between the splines and the humeral bone. Once freed, the threaded insertion handle can be applied to back-slap the humeral component out of the canal.

In the event that the humeral component is unable to be freed using the above methods, it may be necessary to use a vertical humeral corticotomy or anterior humeral window to access the canal and loosen the stem to allow removal.

FIG 51:
Disassembly Fork

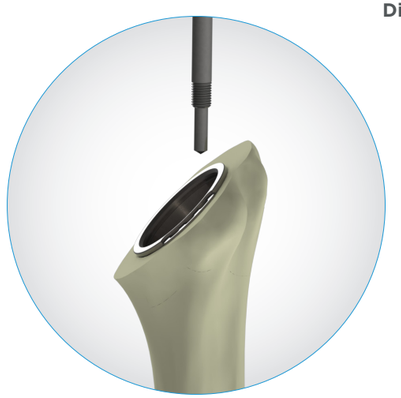


FIG 52:
Proximal Body Disassembly Tool

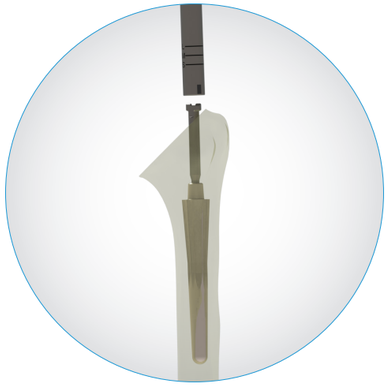


FIG 53:
Distal Stem Removal

Disengagement of the Proximal Body from the Distal Stem (back table)

The tip disassembly fork is placed between the proximal body and distal stem. **[FIG 51]** The fork is then impacted with a mallet until the two components are separated.

Disengagement of the Proximal Body from the Distal Stem (in-situ)

The threaded proximal body disassembly tool is inserted into the proximal body threads and rotated clockwise until the tool disengages the morse taper, **[FIG 52]** at which point the proximal body can be easily removed.

Removal of the Distal Stem (in-situ)

Thread the end of the distal stem removal tool into the distal stem. Then attach the broach handle to the t-shaped end of the removal tool in the same twist-to-lock manner as when connecting to a broach. **[FIG 53]**

ORDERING INFORMATION

HUMERAL IMPLANTS

Part Number	Description
1232-7551-001	Proximal Body Left - Size: Small
1232-7551-002	Proximal Body Left - Size: Medium
1232-7551-003	Proximal Body Left - Size: Large
1232-7552-001	Proximal Body Right - Size: Small
1232-7552-002	Proximal Body Right - Size: Medium
1232-7552-003	Proximal Body Right - Size: Large
1232-7554-001	Locking Screw
1232-7553-002	Press-Fit Stem - Size: 8
1232-7553-003	Press-Fit Stem - Size: 9
1232-7553-004	Press-Fit Stem - Size: 10
1232-7553-005	Press-Fit Stem - Size: 11
1232-7553-006	Press-Fit Stem - Size: 12
1232-7553-007	Press-Fit Stem - Size: 13
1232-7553-008	Press-Fit Stem - Size: 14
1232-7553-009	Press-Fit Stem - Size: 15
1232-7553-010	Press-Fit Stem - Size: 16
1232-7553-011	Press-Fit Stem - Size: 17
1232-7553-012	Press-Fit Stem - Size: 18
1232-7556-001	Cemented Stem - Size: 90-7
1232-7556-004	Cemented Stem - Size: 90-10
1232-7556-007	Cemented Stem - Size: 90-13
1232-7557-001	Cemented Stem - Size: 125-8
1232-7557-003	Cemented Stem - Size: 125-10
1232-7557-005	Cemented Stem - Size: 125-12
1230-7526-001	Ring Poly Insert, 32mm +0
1230-7526-002	Ring Poly Insert, 32mm +4
1230-7527-001	Ring Poly Insert, 36mm +0
1230-7527-002	Ring Poly Insert, 36mm +4
1230-7528-001	Ring Poly Insert, 40mm +0
1230-7528-002	Ring Poly Insert, 40mm +4

SPECIAL ORDER

Part Number	Description
1230-7529-001	Ring SC Poly Insert, 32mm +0
1230-7529-002	Ring SC Poly Insert, 32mm +4
1230-7530-001	Ring SC Poly Insert, 36mm +0
1230-7530-002	Ring SC Poly Insert, 36mm +4
1230-7531-001	Ring SC Poly Insert, 40mm +0
1230-7531-002	Ring SC Poly Insert, 40mm +4

HUMERAL SPACER IMPLANTS

Part Number	Description
1230-7520-001	Humeral Spacer, +12mm
1230-7522-001	Humeral Spacer, +8mm
1230-7521-001	Humeral Spacer Locking Screw

REVERSE GLENOID IMPLANTS

Part Number	Description
1230-7506-001	Standard Baseplate
1230-7507-001	Augmented Baseplate 10°
1230-7533-001	Augmented Boss Baseplate
1230-7534-001	+2 Lateralized Baseplate
1230-7525-001	+4 Lateralized Baseplate
1230-7532-001	6.5mm Center Screw Tri-Pack - 25mm*
1230-7532-002	6.5mm Center Screw Tri-Pack - 30mm*
1230-7532-003	6.5mm Center Screw Tri-Pack - 35mm*
1230-7535-001	Center Post Tri-Pack - 25mm*
1230-7535-002	Center Post Tri-Pack - 35mm*
1230-7535-003	Center Post Tri-Pack - 30mm*
1230-7511-001	Peripheral Locking Screw 4.5 – 12mm
1230-7511-002	Peripheral Locking Screw 4.5 – 16mm
1230-7511-003	Peripheral Locking Screw 4.5 – 20mm
1230-7511-004	Peripheral Locking Screw 4.5 – 24mm
1230-7511-005	Peripheral Locking Screw 4.5 – 28mm
1230-7511-006	Peripheral Locking Screw 4.5 – 32mm
1230-7511-007	Peripheral Locking Screw 4.5 – 36mm
1230-7511-008	Peripheral Locking Screw 4.5 - 40mm
1230-7516-002	Peripheral Compression Screw 4.5 – 16mm
1230-7516-003	Peripheral Compression Screw 4.5 – 20mm
1230-7516-004	Peripheral Compression Screw 4.5 – 24mm
1230-7516-005	Peripheral Compression Screw 4.5 – 28mm
1230-7516-006	Peripheral Compression Screw 4.5 – 32mm
1230-7516-007	Peripheral Compression Screw 4.5 – 36mm
1230-7516-008	Peripheral Compression Screw 4.5 - 40mm
1230-7512-001	Glenosphere 32mm - Standard
1230-7512-002	Glenosphere 32mm - Lateral
1230-7513-001	Glenosphere 36mm - Standard
1230-7513-002	Glenosphere 36mm - Lateral
1230-7513-003	Glenosphere 36mm - Extra Lateral
1230-7514-001	Glenosphere 40mm - Standard
1230-7514-002	Glenosphere 40mm - Lateral
1230-7514-003	Glenosphere 40mm - Extra Lateral
1230-7515-001	Glenosphere Locking Screw

*Includes Locking Cap and Glenosphere Locking Screw

OTHER

Part Number	Description
1230-4292	3.2mm Pin
1230-4217	3mm Drill
1230-4222	Small Driver T20
1230-4264	Small Driver T20 Power
1230-4255	Center Post Trephine
1230-5213	Humeral Drill
1230-4253	Morse Taper Disassembly Tool
1232-4012	T25 Driver
1232-7400-0 01	Catalyst Tuberosity Repair Kit

HEMI / STEMMED ANATOMIC IMPLANTS

Part Number	Description
1231-7601-001	Standard Adapter +0*
1231-7601-002	Standard Adapter +3*
1231-7602-001	Offset Adapter +0*
1231-7602-002	Offset Adapter +3*
1231-7604-001	Humeral Head 42
1231-7604-002	Humeral Head 45
1231-7604-003	Humeral Head 48
1231-7604-004	Humeral Head 51
1231-7604-005	Humeral Head 54
1231-7604-006	Humeral Head 57
1227-7001-001	3-Peg Glenoid, Small
1227-7001-002	3-Peg Glenoid, Medium
1227-7001-003	3-Peg Glenoid, Large
1227-7003-001	Augmented 3-Peg Glenoid, Small
1227-7003-002	Augmented 3-Peg Glenoid, Medium
1227-7003-003	Augmented 3-Peg Glenoid, Large

*Includes locking screw

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