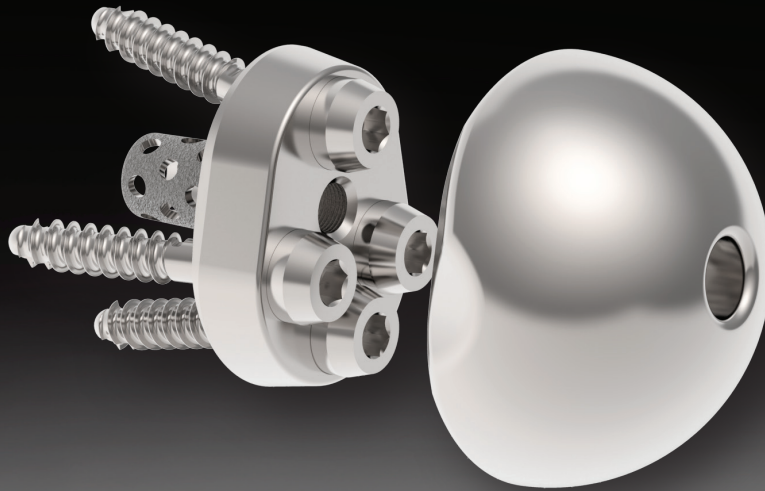


EXACTECH | EXTREMITIES

Operative Technique Addendum



equinox[®]

Small Reverse Shoulder for Legacy
Operative Technique Addendum to
Equinox Platform Shoulder System



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NOTE

This document presents an addendum to the Equinox Platform Shoulder System operative technique¹ to include the Equinox Small Reverse Shoulder devices. For implantation of the Small Reverse with Ergo instrumentation, see the Small Reverse Ergo Shoulder for Operative Technique.²

The Equinox Small Reverse implants are inserted using steps similar to those used to insert the standard Equinox reverse shoulder glenoid plate and glenospheres. The steps described in this operative technique addendum address the steps specific to the Equinox Small Reverse implants and related instrumentation.

Surgeons should be aware the Equinox Small Reverse Shoulder baseplates used with this operative technique addendum provide four screw holes, which may limit fixation options as compared to standard Equinox baseplates, which provide six.

INTRODUCTION

Thank you for considering the Equinox[®] Shoulder System. We have been committed to providing clinical solutions to challenges in shoulder arthroplasty since 2004. The Equinox System is unique because of its focus on anatomical replication and options for challenging glenoids and revisions. As a complement to this existing system, we are pleased to present the next generation of our glenoid implants. The Exactech Small Reverse implants were designed through collaboration with thought leaders worldwide; the result is a small baseplate that delivers an anatomic shape, a press-fit bone cage for strong initial fixation, and compatibility with the Equinox platform humeral components. It is our pleasure to present the Equinox Small Reverse Shoulder operative technique.

Respectfully,

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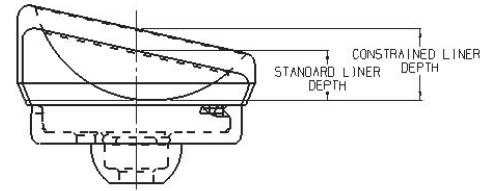
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HUMERAL LINER DEPTH COMPARISONS

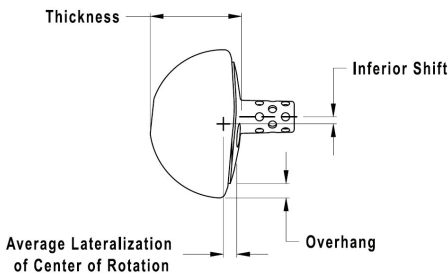
	Standard Liner Depth (+0mm and +2.5mm)	Constrained Liner Depth (+0mm and +2.5mm)
36 Humeral Liners	8.5	12.0
40 Humeral Liners	8.6	12.3



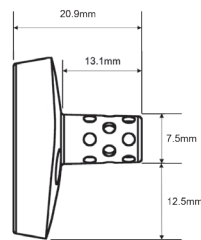
SMALL REVERSE GLENOSPHERE / GLENOID BASEPLATE

Part Number	Description	Glenosphere Diameter (mm)	Glenosphere Thickness (mm)	Glenosphere Inferior Overhang (mm)	Average Lateralization of Center of Rotation (mm)
320-31-36	36mm Small Reverse Glenosphere	36	22.3	3.5	2.8
320-31-40	40mm Small Reverse Glenosphere	40	24.3	5.0	2.8
320-32-36	36mm Expanded Small Reverse Glenosphere	36	26.1	3.0	6.6
320-32-40	40mm Expanded Small Reverse Glenosphere	40	28.1	5.0	6.6

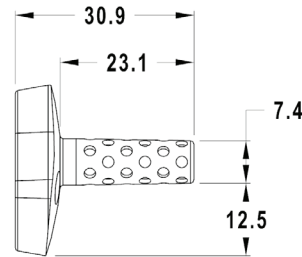
Small Reverse Glenosphere and Baseplate



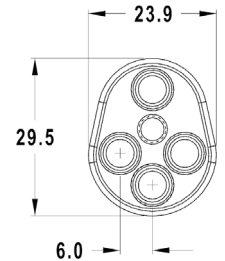
Small Reverse Baseplate



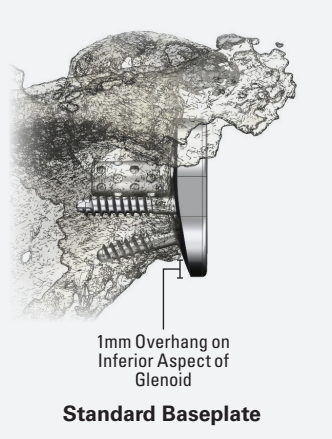
Small Reverse Extended Cage Baseplate



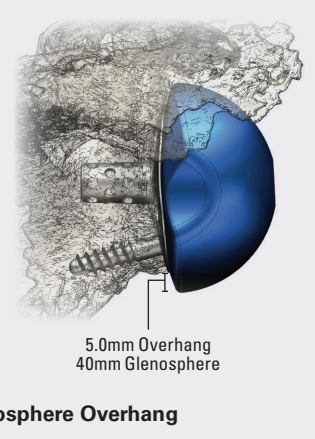
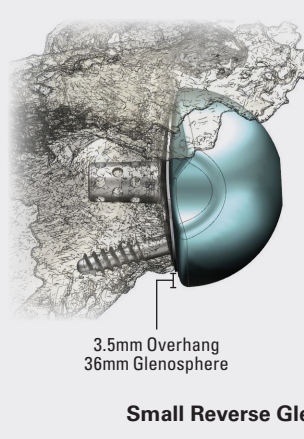
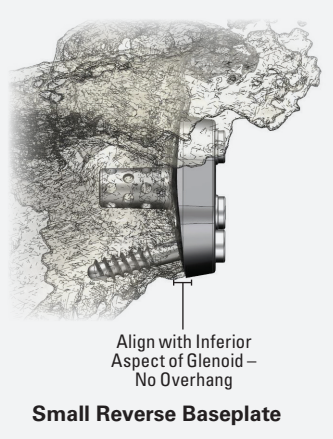
Small Reverse Baseplate



STANDARD RTSA

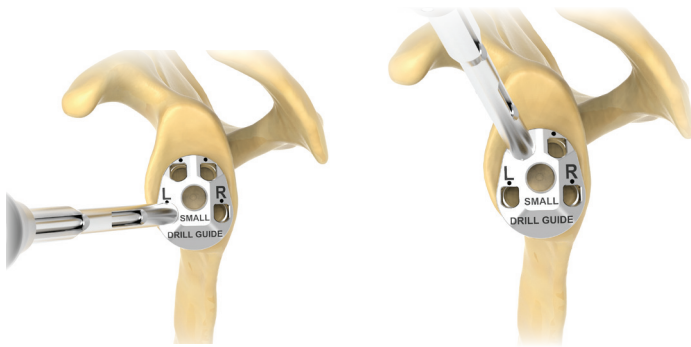


SMALL REVERSE RTSA



Please refer to the Reverse Shoulder section of the Equinox Platform Shoulder System Operative Technique¹ for information related to patient positioning, surgical approaches, and the preparation of the humerus (Steps 1 – 3).

OPERATIVE TECHNIQUE OVERVIEW



A1. DELTOPECTORAL APPROACH

A2. SUPEROLATERAL APPROACH

Figure A

Approach to Glenoid Drill Guide Placement

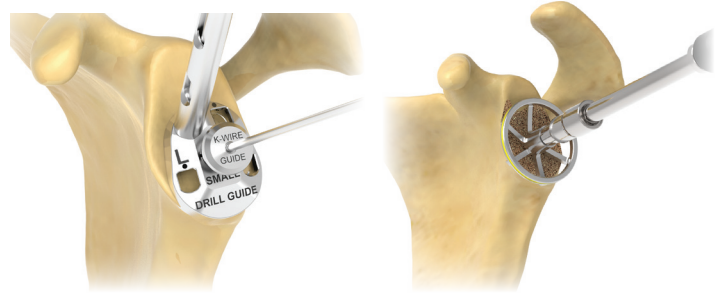


Figure B

Pilot-Tip Drilling & Reaming



Figure C

Cannulated Drilling & Reaming

Figure D

Implanting the Glenoid Plate

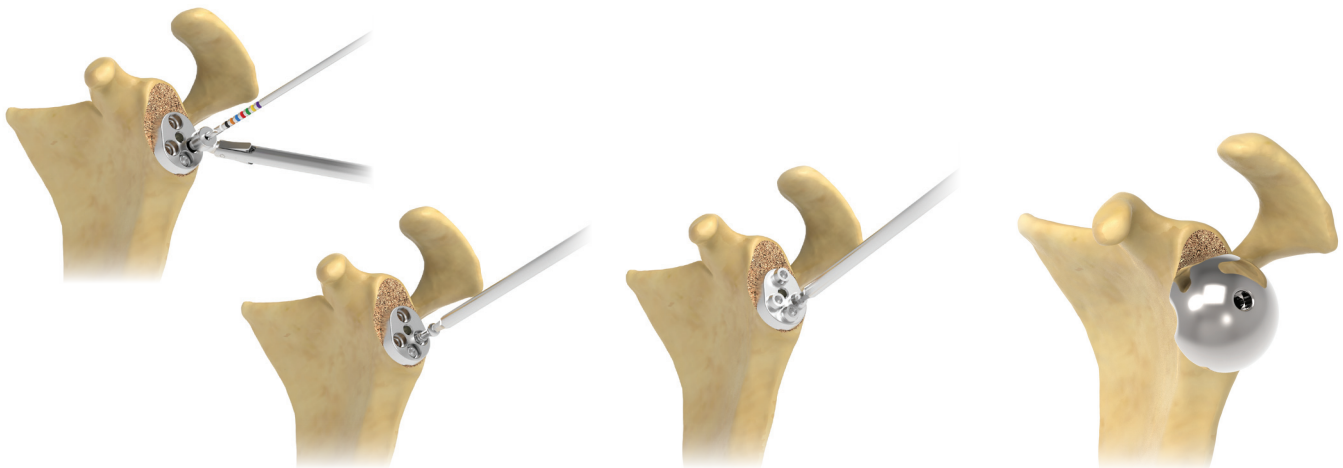


Figure E

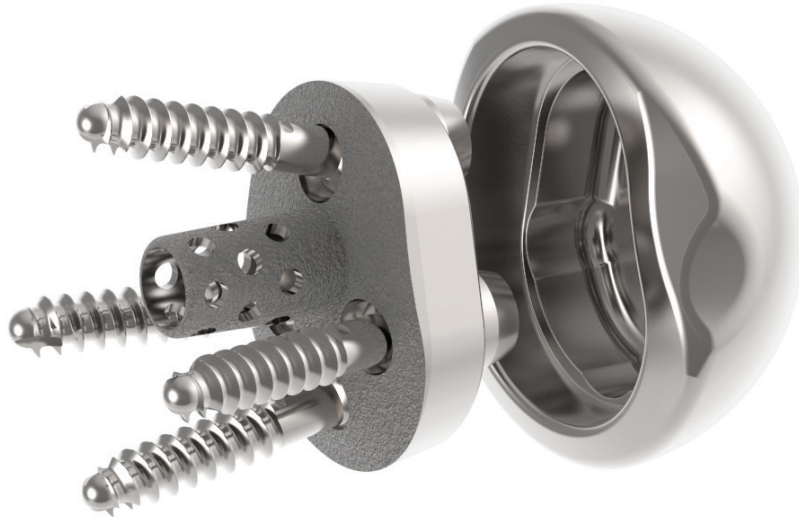
Drill and Implant Compression Screws

Figure F

Tighten Locking Caps

Figure G

Insert Trial Glenosphere or Glenosphere



The Equinox Small Reverse implants are inserted using steps similar to those used to insert the standard Equinox reverse shoulder glenoid plate and glenospheres. The steps described in this operative technique addendum address the steps specific to the Equinox Small Reverse implants and related instrumentation.

INDICATIONS FOR USE

The Equinox 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 Equinox 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 FOR USE

Use of the Equinox 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.

DETAILED OPERATIVE TECHNIQUE

APPROACH TO GLENOID DRILL GUIDE PLACEMENT

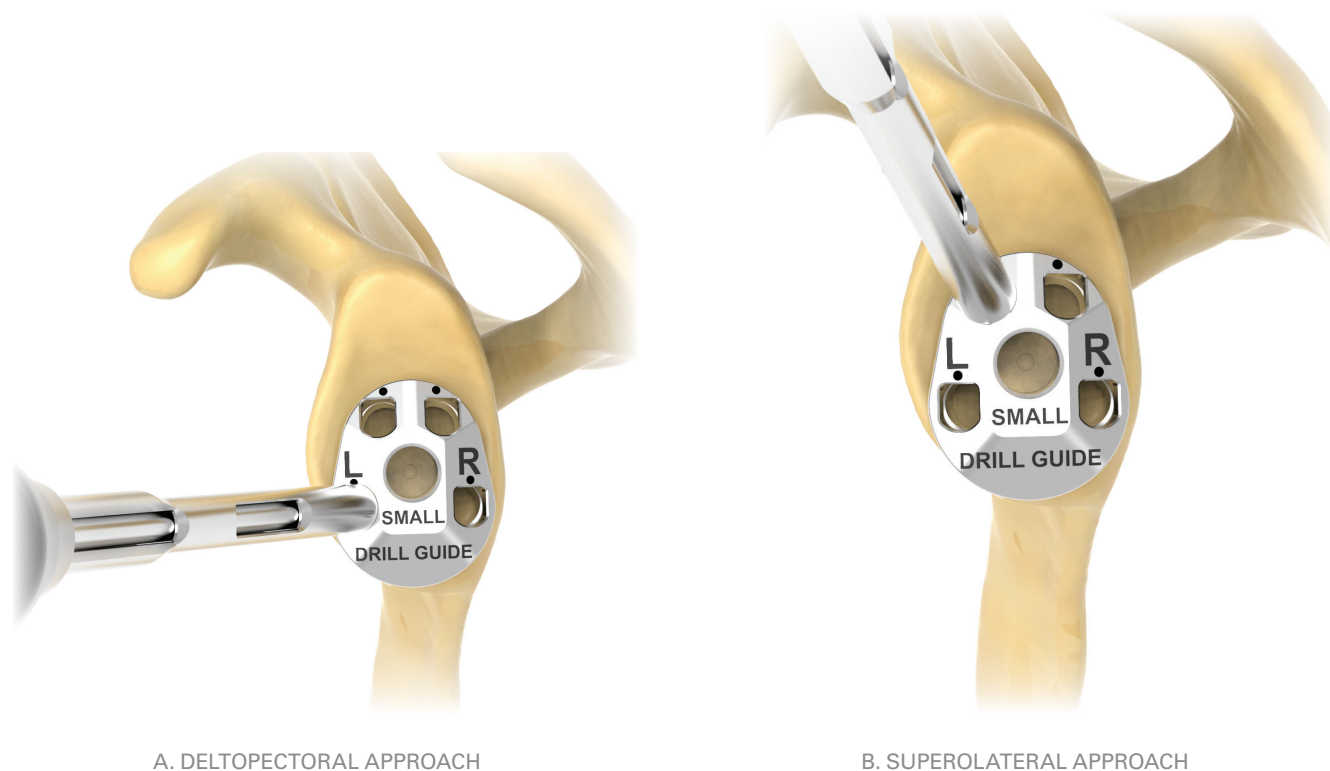


Figure 1

Drill Guide Placement on Glenoid

STEP A: APPROACH TO GLENOID DRILL GUIDE PLACEMENT

The **Small Reverse Drill Guide Glenoid Baseplate (321-35-20)** should be aligned with the inferior glenoid rim to ensure the glenosphere is properly positioned in the superior-inferior position (*Figure 1*). Attach the **Small Reverse Glenoid Baseplate Drill Guide (321-35-20)** to the **Modular Glenoid Guide Handle (315-52-11)** by **matching the laser markings on both the Drill Guide and Handle**, as shown in *Figure 1*.

Note: Two handle orientations (Deltopectoral or Superolateral approach) are offered for the two different surgical approaches.

Note: See “Preparing the Glenoid” in the Equinox Platform Shoulder System Operative Technique¹ for tips on retractor positioning.

Note: While the Equinox Small 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.

DETAILED OPERATIVE TECHNIQUE

PILOT-TIP DRILLING & REAMING



Figure 3

Connect Modular Cannulated TriDrive to Powered Hand Piece

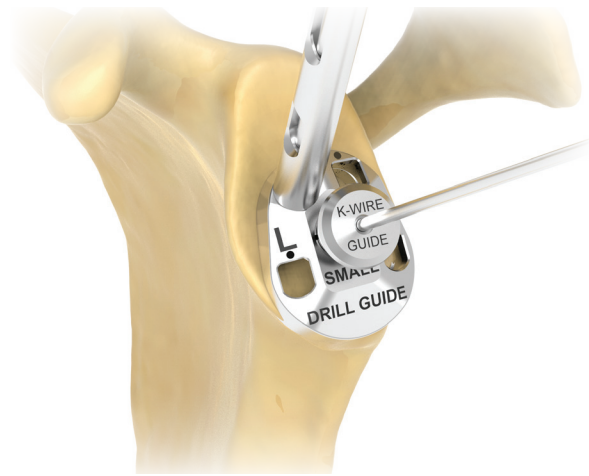


Figure 2

Drill 2mm Pilot Hole through the K-wire Alignment Guide



Figure 4

Connect Modular Reverse Pilot-Tip Reamer to Modular Cannulated TriDrive

STEP B: PILOT-TIP DRILLING & REAMING

Pilot-Tip Option: Drill Pilot Hole, Ream the Glenoid, and Drill Small Glenoid Plate Hole

If using the **Pilot-Tip Reamers**, drill the pilot hole using the **2.0mm Drill Bit (321-15-06 part of kit 321-20-00)** through the **K-wire Alignment Guide (321-35-10) / Modular Small Glenoid Plate Drill Guide Assembly** to create the central

axis for reaming the glenoid (*Figure 2*). Connect the **Modular Cannulated TriDrive (315-25-00)** to the powered hand piece using a Jacobs Chuck (*Figure 3*). Next, connect the **Modular Reverse Pilot-Tip Reamer** to the Modular Cannulated TriDrive (*Figure 4*). The **Modular Reverse Pilot-Tip Starter Reamer (321-25-01)** is provided to aid the surgeon in initial glenoid preparation.

DETAILED OPERATIVE TECHNIQUE

PILOT-TIP DRILLING & REAMING

Glenosphere for Small Glenoid Plate	Standard Reamer Size	Color of Standard Reamer
36mm	38mm	Blue
40mm	42mm	Yellow

Table 1

Standard Reamer Sizes for Small Reverse Shoulder Glenospheres

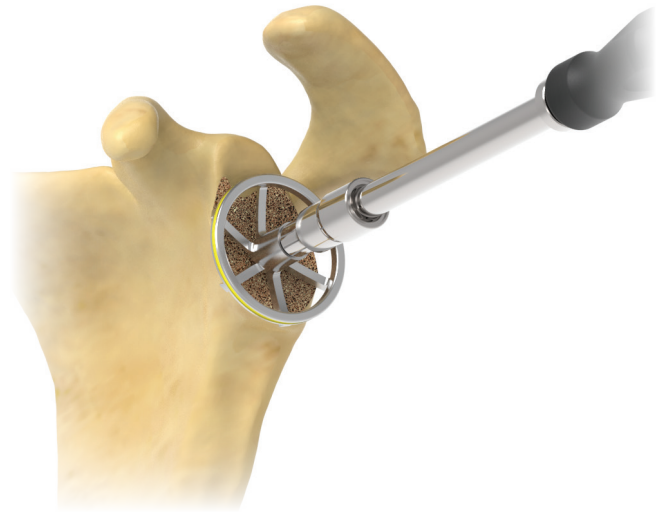


Figure 5

Ream the Glenoid

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 5*). Reaming begins with the Reverse Shoulder Starter Reamer and progresses to the **Modular Reverse Pilot-Tip Reamers** 38mm and 42mm (**321-25-38/42**) based upon the anticipated size of the glenosphere. *Table 1* shows the recommended standard reamer size for each Small Reverse glenosphere size. Starter Reamer is 26mm in diameter.

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 Pilot-Tip.

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 Small 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).

SURGICAL TIP

Start the reamer prior to engaging bone.



Figure 6

Connect Modular Center Peg Drill to Modular Cannulated TriDrive

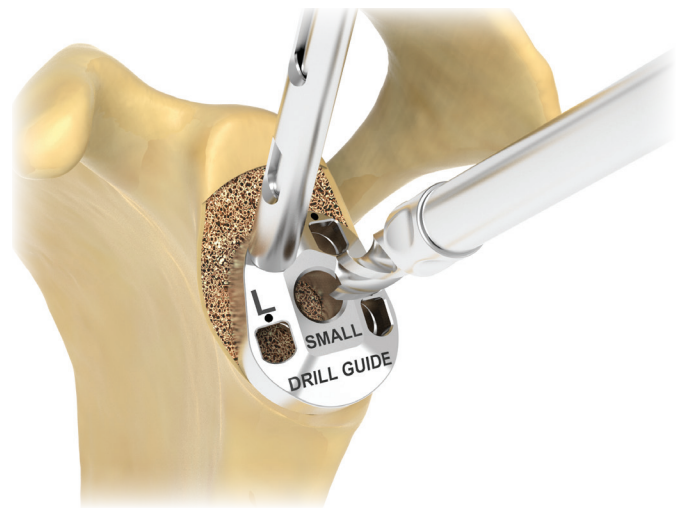


Figure 7

Drill Small Glenoid Plate Cage Hole

After reaming has been completed, the inferior aspect of the Modular Small Glenoid Plate Drill Guide is realigned with the inferior aspect of the glenoid. Connect the **Modular Center Peg Drill (315-27-60)** to the Modular Cannulated TriDrive and drill cage hole through the center hole of the Modular Small

Glenoid Plate Drill Guide (*Figures 6 and 7*). The collar around the Modular Center Peg Drill should be fully seated on the Small Glenoid Plate Drill Guide to ensure the proper depth is drilled for the cage.

DETAILED OPERATIVE TECHNIQUE

CANNULATED DRILLING & REAMING

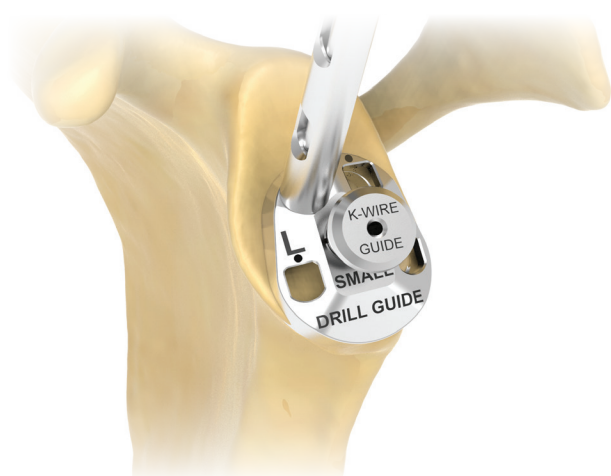


Figure 8

Align Small Glenoid Plate Drill Guide and K-wire Guide Assembly on Glenoid

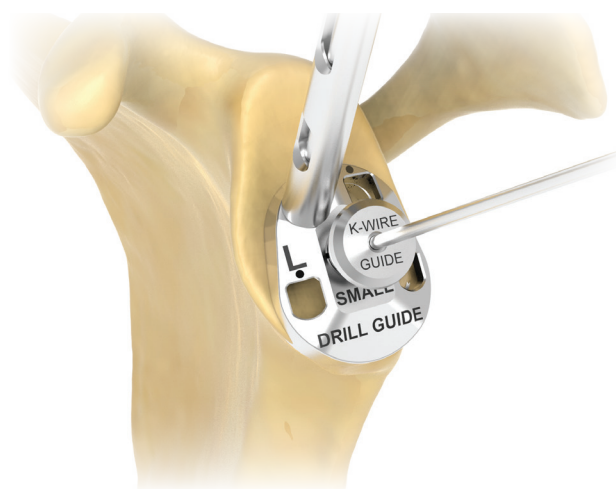


Figure 9

Insert K-wire through K-wire Alignment Guide

STEP C: CANNULATED DRILLING & REAMING

For the cannulated method, align the inferior aspect of the Modular Small Glenoid Plate Drill Guide with the inferior aspect of the native glenoid bone. Attach the **K-wire**

Alignment Guide (321-35-10) to the Modular Small Glenoid Plate Drill Guide (*Figure 8*). Insert the 0.079 inch K-wire through the assembled guide (*Figure 9*). Remove the guide assembly by sliding it over the inserted K-wire.



Figure 10

Connect Modular Reverse Cannulated Reamer to Modular Cannulated TriDrive

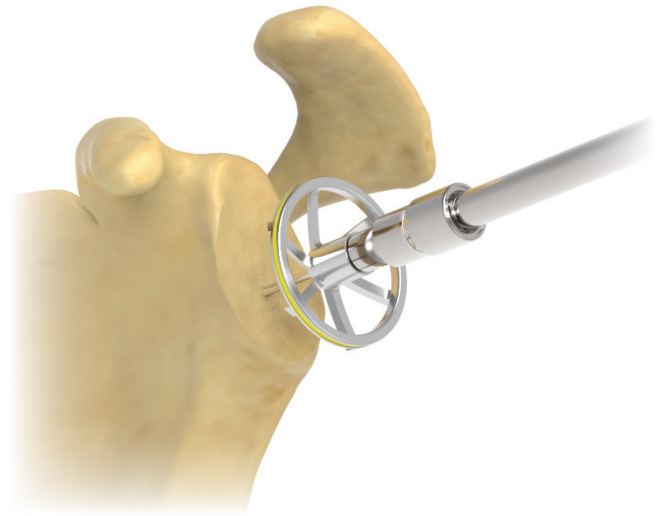


Figure 11

Ream the Glenoid over the K-wire

Connect the appropriately-sized, color-coded **Modular Cannulated Reamer (321-35-01/38/42)** to the Modular Cannulated TriDrive (315-25-00) (*Figure 10*). Reaming begins with the Reverse Shoulder Starter Reamer and progresses to the 38mm and 42mm sizes based upon the anticipated size of the glenosphere (see *Table 1* for reamer size recommendation). 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 11*). 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 small 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).

DETAILED OPERATIVE TECHNIQUE

CANNULATED DRILL CAGE HOLE & IMPLANTING THE SMALL GLENOID PLATE

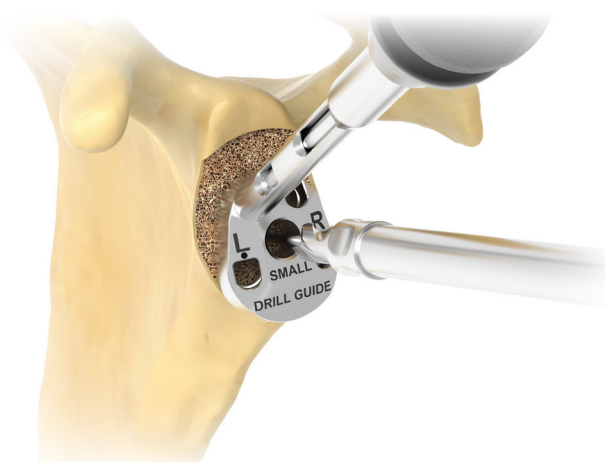


Figure 12

Drill over K-wire with Modular Cannulated Center Peg Drill



Figure 13

Assemble the Small Glenoid Plate with Bone Graft

After reaming over the K-wire, drill over the existing K-wire with the **Modular Cannulated Center Peg Drill (315-27-63)** until the drill collar is fully seated on the Modular Small Glenoid Plate Drill Guide (*Figure 12*). Remove drill and K-wire alignment guide assembly directly over K-wire. Remove K-wire once glenoid preparation is complete.

STEP D: IMPLANTING THE SMALL GLENOID PLATE

Prior to implanting the **Small Glenoid Plate (320-35-01)**, there are two options that exist for placing bone graft in the small glenoid plate's cage (*Figure 13*).

1) Using the **Glenoid Plate Coring Reamer (321-07-10)** 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.

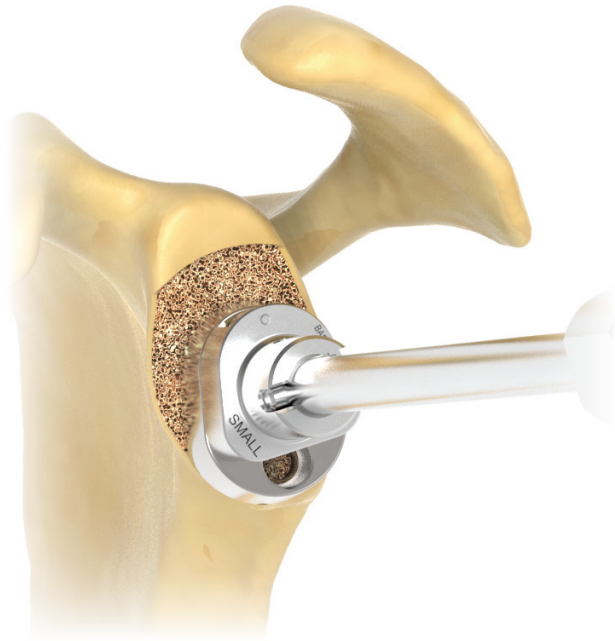


Figure 14

Glenoid Plate and Baseplate Inserter Placement on Glenoid



Figure 15

Implanted Glenoid Plate

Once the Small Glenoid Plate is ready for insertion, the Small Glenoid Plate is attached to the **Small Glenoid Plate Inserter 321-35-24**). The Inserter connects to the top half of the Small Glenoid Plate such that the central pin aligns with the threaded central hole and the peripheral pegs connect to the top peripheral holes of the Small Glenoid Plate. The Small Glenoid Plate is press-fit into position taking care to respect the correct rotational orientation (*Figure 14*).

Note: When inserting the final implant, keep the inserter pointed up with a hand underneath until the implant is in the wound.

Note: Remove inserter by pulling straight back. Do not bend and pull.

STEP E: DRILL AND IMPLANT COMPRESSION SCREWS

The four holes on the Small Glenoid Plate provide the surgeon with options to maximize fixation of the Small Glenoid Plate, and each case should be individualized (*Figure 15*). Using all four (4) screw locations will provide maximum fixation and support of the Small Glenoid Plate.

DETAILED OPERATIVE TECHNIQUE

DRILL AND IMPLANT COMPRESSION SCREWS

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

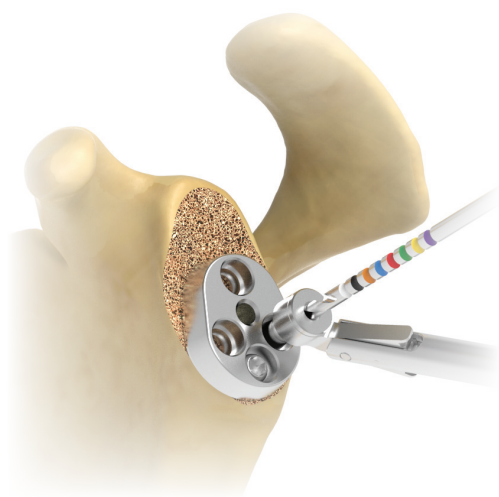


Figure 16
Drilling Pilot Hole for Compression Screw



Figure 17
Compression Screw Insertion

The holes should be drilled using the **Adjustable Angle Drill Guide (321-15-04)** and the **3.2mm Drill (321-15-07 part of 321-20-00)**, taking note of the depth of each hole using either the color-coded drill or the **Glenoid Screw Depth Gauge (321-15-09)** (*Figure 16*). Each hole on the Small Glenoid Plate allows 20 degrees of angular variability so the orientation of the screws can be selected to maximize bone purchase.

The **4.5mm Compression Screws (Kit #s 320-20-18,22,26,30,34,38,42,46 include standard locking caps)** are provided in lengths between 18mm and 46mm in 4mm increments (*Table 2*). The appropriately sized Compression

Screws are inserted into the drilled holes to achieve fixation and compression of the Small Glenoid Plate to the glenoid (*Figure 17*). 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 (301-07-80)** is included in the standard Equinox instrument set to facilitate the placement and tightening of the screws.

Note: The central cage of the glenoid plate limits the angular variability for converging screws.



Figure 18
Standard Locking Cap Insertion

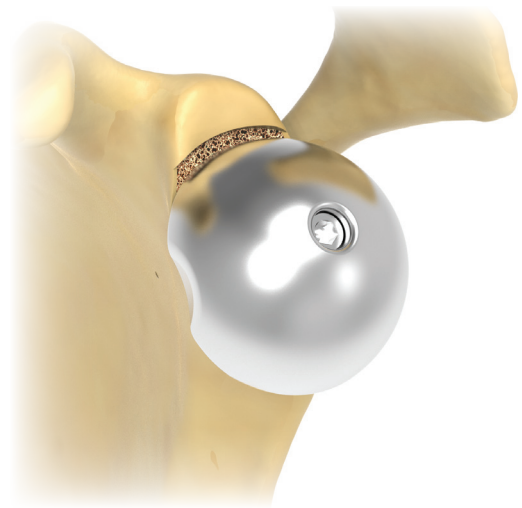


Figure 19
Glenosphere Implant Assembly

STEP F: TIGHTEN LOCKING CAPS

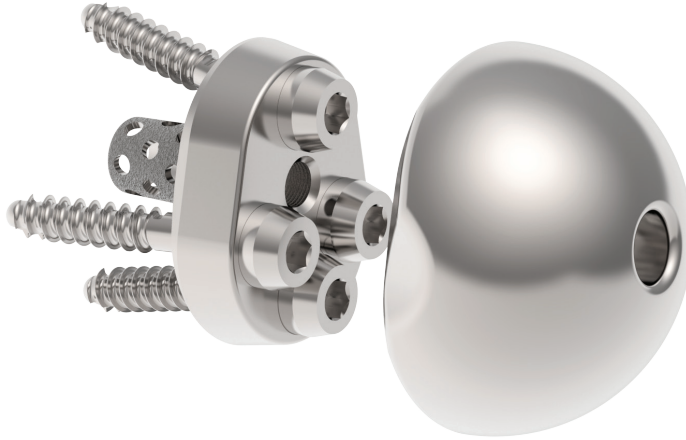
After all Compression Screws are tightened by hand as deemed appropriate by the orthopaedic surgeon, the surgeon should insert the **Locking Caps (Kit #s 320-20-18,22,26,30,34,38,42,46 include compression screws)** into each screw hole. This will lock each Compression Screw and prevent the screws from backing out. **Locking Caps are threaded perpendicular to the plate** (Figure 18).

STEP G: INSERT GLENOSPHERE TRIAL OR 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 Equinox Small Glenoid Baseplate mandates that the glenosphere can only fit in one specific orientation.** With the exception of the **Universal Glenosphere Inserter Clamp (321-01-29)**, all standard Equinox Glenosphere Inserters can be used for insertion of the Small Reverse Glenosphere Trials and Glenospheres (Figure 19).

DETAILED OPERATIVE TECHNIQUE

INSERT GLENOSPHERE TRIAL OR GLENOSPHERE



Curvature	Color of Trials
36mm	Green
40mm	Purple

Table 3
Color-Coding of Trials

For the Small Reverse Shoulder, the Glenosphere Trial and Humeral Liner Trial colors are shown in *Table 3*. See “Inserting the Glenosphere Trial” in the Equinox Platform Shoulder System Operative Technique¹ for additional information regarding Glenosphere and Glenosphere Trial insertion instruments and technique.

SURGICAL TIP

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.

Please refer to the Reverse Shoulder section of the Equinox Platform Shoulder System Operative Technique¹ for information related to the implantation of the humeral components, closure, and post-operative rehabilitation.

CATALOG NUMBER	DESCRIPTION
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
320-31-36	Small Reverse Glenosphere, 36mm
320-31-40	Small Reverse Glenosphere, 40mm
320-32-36	Small Reverse Expanded Glenosphere, 36mm
320-32-40	Small Reverse Expanded Glenosphere, 40mm
320-35-01	Small Reverse Glenoid Baseplate
320-36-00	Small Reverse Humeral Liner, 36mm, +0
320-36-03	Small Reverse Humeral Liner, 36mm, +2.5mm
320-36-10	Small Reverse Humeral Liner, 36mm, +0mm Constrained
320-36-13	Small Reverse Humeral Liner, 36mm, +2.5mm Constrained
320-40-00	Small Reverse Humeral Liner, 40mm, +0
320-40-03	Small Reverse Humeral Liner, 40mm, +2.5
320-40-10	Small Reverse Humeral Liner, 40mm, +0 Constrained
320-40-13	Small Reverse Humeral Liner, 40mm, +2.5 Constrained



INSTRUMENT LISTING

CATALOG NUMBER DESCRIPTION

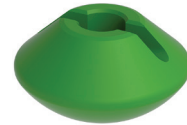
315-52-11 Modular Glenoid Guide Handle



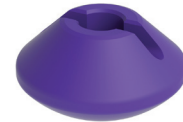
321-35-20 Small Reverse Drill Guide Glenoid Baseplate



321-09-36 Humeral Liner Impactor Tip, 36mm



321-09-40 Humeral Liner Impactor Tip, 40mm



321-35-10 Small Reverse K-wire Alignment Guide



321-35-24 Small Reverse Inserter Glenoid Baseplate



321-31-36 Small Reverse Glenosphere Trial, 36mm

321-32-36 Small Reverse Glenosphere Trial, 36mm Expanded*



321-31-40 Small Reverse Glenosphere Trial, 40mm

321-32-40 Small Reverse Glenosphere Trial, 40mm Expanded*



321-36-00 Small Reverse Humeral Liner Trial, 36mm, +0

321-36-03 Small Reverse Humeral Liner Trial, 36mm, +2.5

321-36-10 Small Reverse Humeral Liner Trial, 36mm, +0, Constrained

321-36-13 Small Reverse Humeral Liner Trial, 36mm, +2.5, Constrained



321-40-00 Small Reverse Humeral Liner Trial, 40mm, +0

321-40-03 Small Reverse Humeral Liner Trial, 40mm, +2.5

321-40-10 Small Reverse Humeral Liner Trial, 40mm, +0, Constrained

321-40-13 Small Reverse Humeral Liner Trial, 40mm, +2.5, Constrained



* = Small Reverse Expanded Glenospheres are not in the Ergo Trays, please order OPT321SMEXPAND.

REFERENCES

1. 718-01-30 Rev J, Platform Shoulder System Operative Technique
2. 12-0001666 Equinoxe Small Reverse Shoulder for Ergo Operative Technique Addendum

For additional device information, refer to the Equinoxe Platform Shoulder System—Instructions for Use for a device description, indications, contraindications, precautions and warnings. For further product information, please contact Customer Service, Exactech, 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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