ZIMMER BIOMET
Your progress. Our promise.®

Comprehensive® Convertible Glenoid

Surgical Technique Addendum

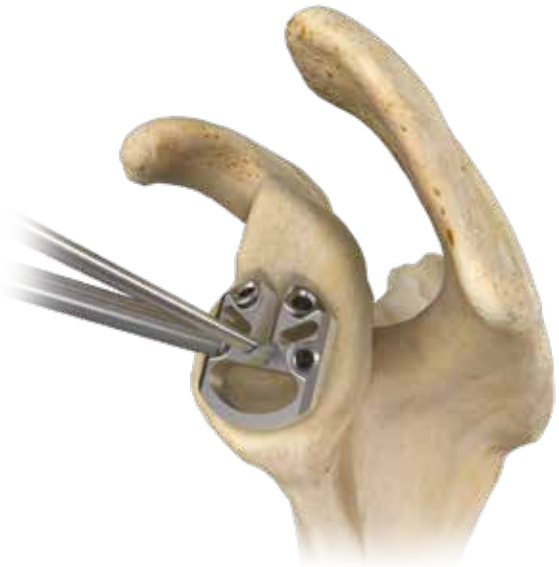


Figure 1

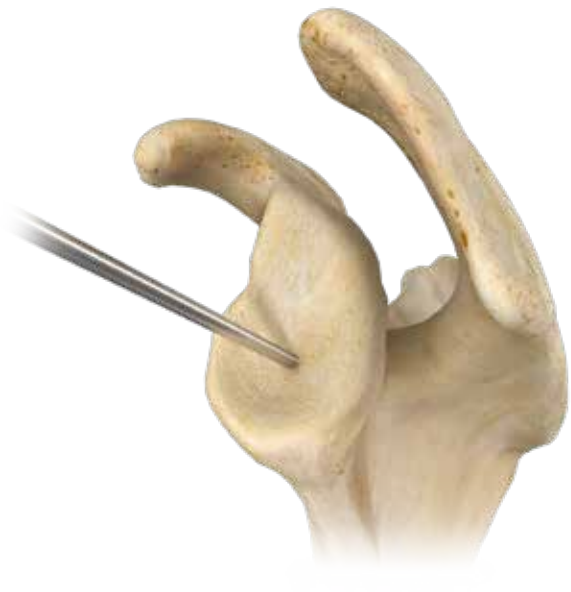


Figure 2

Sizing and Pin Placement

Attach the threaded glenoid guide handle to the glenoid sizer. Introduce the glenoid sizer to the native glenoid face taking note that any wear correction should be made with the glenoid sizer, prior to introducing the Steinmann pin. Insert a 3.2 mm Steinmann pin into the glenoid at the desired angle and position, ensuring the pin engages or perforates the medial cortical wall (Figures 1–2). A completely secure Steinmann pin is essential to ensure the subsequent reamer has a stable cannula over which to ream. When the Steinmann pin is placed correctly within the guide, it will lie flush within the inferior groove. Alternatively, a neutral position sizer is available when perpendicular placement of the 3.2 mm Steinmann pin is desired.

Note: Use the neutral position sizer when perpendicular placement of the Steinmann pin is desired. A 10 degree inferior tilt sizer is also available for placement similar to that of a reverse shoulder prosthesis. Regardless of the chosen guide/sizer, glenoid defects and/or asymmetric wear will need to be accounted for when placing the Steinmann pin.

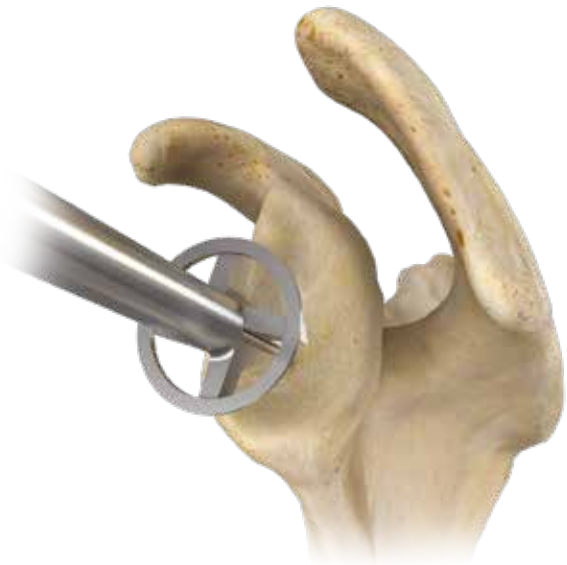


Figure 3

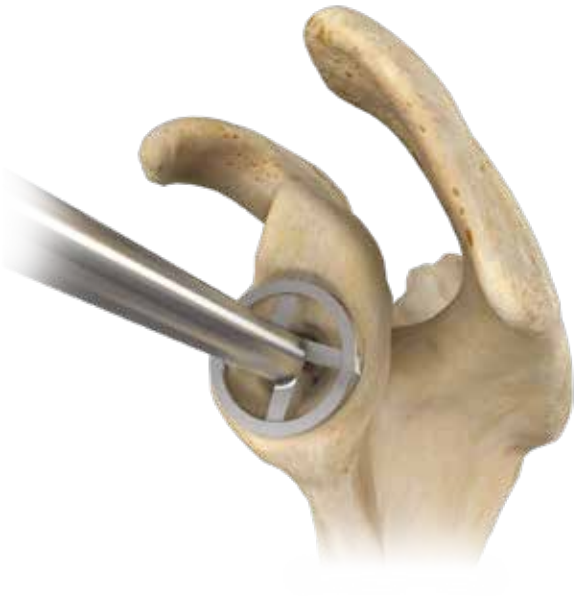


Figure 4

Baseplate Reaming

Position the standard cannulated baseplate reamer over the Steinmann pin (Figure 3).

Note: Preparation for the glenoid must be done using the STANDARD glenoid baseplate reamer.

Begin reamer rotation before reamer teeth make contact with the glenoid bone. Ream the glenoid to the desired level, ensuring that the medial geometry of the baseplate is completely reamed. It is critical that the glenoid is adequately reamed to ensure complete seating of the glenoid baseplate. To ensure that joint space is not compromised and that additional thickness is not introduced, the baseplate should be completely counter-sunk within the glenoid (Figure 4).

Remove the standard cannulated glenoid reamer, ensuring that the Steinmann pin remains securely positioned in the glenoid. If the Steinmann pin comes out, the convertible glenoid baseplate trial can be used to reposition and place the Steinmann pin into the glenoid.

Note: There is not a stop on the glenoid reamer. Continual attention to the reaming depth is important.

Figure 6

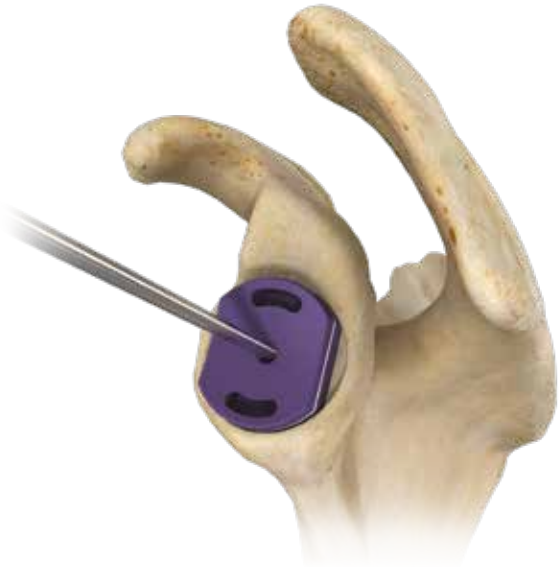


Figure 7

Trialing

Using the glenoid provisional forceps, position the one-piece baseplate/glenoid provisional over the Steinmann pin and into the prepared glenoid. If the provisional does not fully seat, the baseplate reamer should be used to completely prepare the baseplate geometry (Figures 6–7). The baseplate/glenoid provisional is at the proper depth when the white circumferential line is flush with the prepared glenoid.

Once the desired humeral head and glenoid trials are in place, perform a trial reduction to assess range of motion and soft tissue tension.

Note: If additional bone or soft tissue is present on the inferior shelf, use a ronguer to trim unwanted bone to ensure complete seating of the glenoid liner (TSA) or glenosphere (RSA) into the baseplate. If available, the included planer may be utilized to remove this inferior bone.

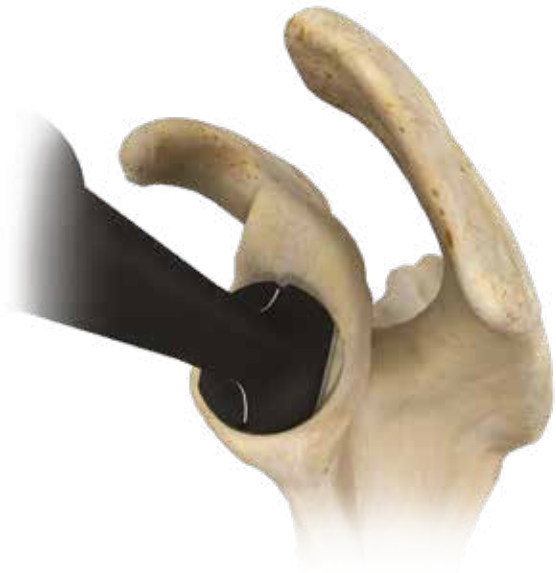


Figure 8

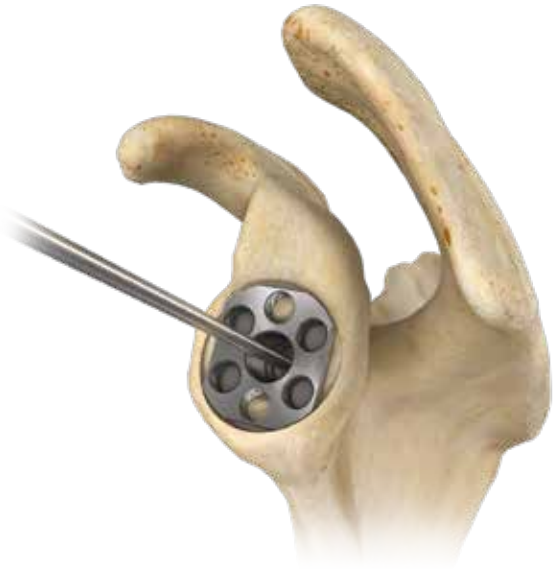


Figure 9

Baseplate Impaction

Place the glenoid baseplate implant onto the end of the cannulated baseplate impactor. Impact the baseplate into the glenoid and remove the baseplate impactor (Figure 8). Keep in mind that the hash-marks on the base of the inserter align with the trajectory of the inferior/superior screws. The medial side of the baseplate should be fully seated onto the face of the glenoid surface, and the face of the baseplate should be flush within the native glenoid. Visual confirmation can be attained by checking for gaps between the reamed glenoid surface and baseplate at the screw holes. A small nerve hook may aid in confirming complete seating of the baseplate (Figure 9). The glenoid baseplate is now seated, and determination of the appropriate length 6.5 mm central screw can be made.

Note: Application of saline or other appropriate lubrication to impactor tip o-ring may aid in distraction of impactor from baseplate after impaction.

Figure 10

Central Screw Selection

6.5 mm central screw length determination may be made in one of the three following methods:

a. With Steinmann pin in place, position the central screw drill guide/template over the pin and read the corresponding depth marking on the pin from the back of the drill guide.

b. If the Steinmann pin is removed or falls out, insert the central screw drill guide/template into the glenoid baseplate and drill a 3.2 mm diameter hole to the desired depth. Read corresponding depth marking on the 3.2 mm diameter drill from the back of the drill guide.

c. If Steinmann pin is removed or falls out, place the convertible glenoid central screw depth gauge (brown tip) (Figure 10) into the reverse Morse central taper of the glenoid baseplate and read the corresponding depth marking from the gauge.

Figure 11

Figure 12

Central Screw Insertion

Insert the desired length 6.5 mm central screw and completely tighten with the 3.5 mm hex driver (Figure 11). To verify the 6.5 mm central screw is fully seated in the baseplate, a check with the central screw drill guide/template should be performed. Simply attach the central screw drill guide/template to the guide handle, and insert the guide into the reverse Morse taper of the baseplate. If the guide sits flush on the baseplate without rocking or toggling, the central screw is completely and correctly seated. If the guide does not sit flush, the central screw is not completely tightened. Additional effort should be made to inspect for unwanted soft tissue or debris behind the screw head, then fully seat the central screw. A fully seated central screw provides the best compression and fixation, as well as ensures the male taper of the glenosphere will fully engage, if performing a reverse shoulder arthroplasty (Figure 12).

Tip: The most common length of the central screw is between 25 – 35 mm.

Figure 13

Peripheral Selection / Insertion

Choose the fixed angle or variable angle drill guide and thread into the superior screw hole (Figure 13). With the 2.7 mm peripheral drill bit, drill the superior hole and read the desired depth marking at the end of the drill guide. Unscrew the threaded peripheral drill guide from the baseplate, and insert the appropriate peripheral screw. Follow the same procedure for the inferior hole.

Note: Inferior/superior drill guide shown (405882) in Comprehensive Reverse instrumentation cannot be used with the convertible baseplate.

As an alternative method of screw length measurement, a depth gauge is available. Insert the depth gauge directly into the desired baseplate peripheral hole noting the depth marking.

Note: If using the variable-angle threaded peripheral drill guide, the non-locking 4.75 mm peripheral screw must be used. Six degrees of angulation in any direction is possible.

Note: If using the fixed-angle threaded peripheral drill guide, either the locking or non-locking 4.75 mm peripheral screws may be used.

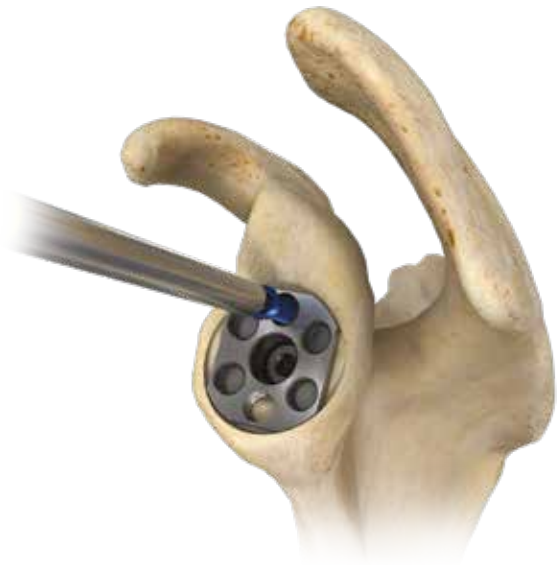


Figure 14

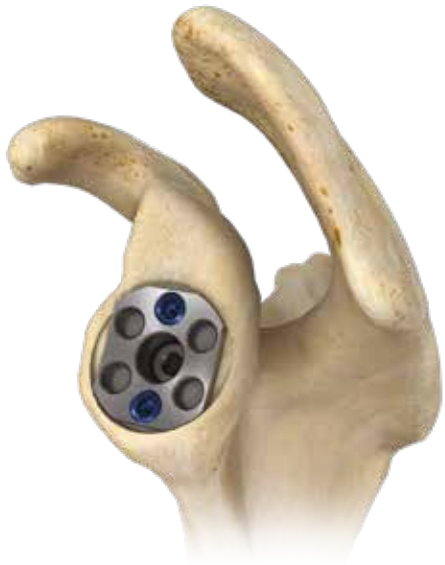


Figure 15

Peripheral Screw Insertion

Using the 3.5 mm hex driver, insert the selected 4.75 mm screw into the baseplate and tighten until fully seated (Figures 14-15).

WARNING: It is important to ensure the screw driver and screw are parallel with each other and fully engaged as you insert the screws using the included ratchet handle and driver. Do not insert screws under power. Deviation from this technique may lead to stripping of the driver and screw interface. Once the screws are fully seated in the baseplate, do not over-tighten. **Screw head location should be flush with the baseplate to ensure proper poly liner engagement (TSA).**

Note: If you have trouble inserting the screw, use the T-Handle, back out 3-4 rotations and re-insert.

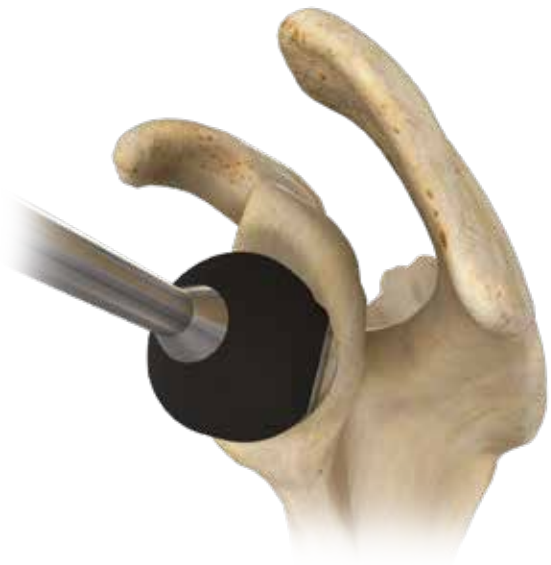


Figure 16

Figure 17

Poly Liner Insertion

Using the self-retaining impactor, insert the polyethylene liner into the baseplate ensuring that the inferior/superior direction is correct.

Note: The opening around the lip of the impactor should be facing inferior to avoid having the impactor make contact with inferior bone.

Prior to impaction, a tactile feel should be noticed. Check that the four peripheral pegs are aligned with the holes in the baseplate. Once aligned, impact the liner using the glenoid liner impactor. It is advised to check that the liner is fully seated within the baseplate (Figures 16–17).

Note: When removing liner impactor from liner, pull perpendicular to glenoid face.

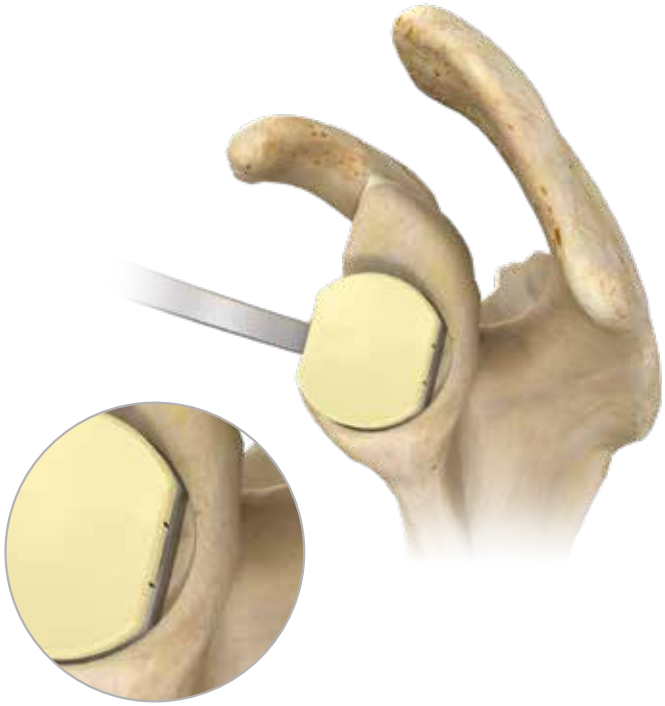


Figure 18

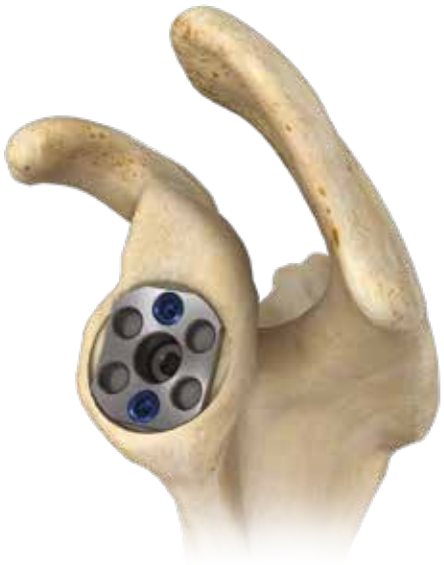


Figure 19

Conversion of TSA to RSA

In the event of a conversion from a total shoulder to a reverse shoulder arthroplasty, the polyethylene glenoid liner will need to be removed from the glenoid baseplate. Utilization of a thin, curve-tipped osteotome will aid in the removal of a seated glenoid liner. The dark etched lines on the sides (anterior/posterior) of the poly align with the locking posts. This osteotome should be targeted between these lines (Figure 18). Upon removing the liner from the baseplate, ensure that remaining polyethylene posts from the glenoid liner are not present within the baseplate. If post removal is required, simply use a pickups to remove remaining post material from the glenoid baseplate. Ensure that all poly is removed prior to glenosphere insertion (Figure 19).

Surgical steps relating to the Comprehensive Anatomic or Reverse procedures can be found in each respective technique. These items include the following:

- Humeral stem selection and preparation
- Humeral tray and bearing selection, assembly and removal
- Glenosphere selection, offset, positioning and impaction

Note: Prior to insertion of the glenosphere implant, ensure that the taper is free of obstructions or any foreign material and that the taper is clean and dry.

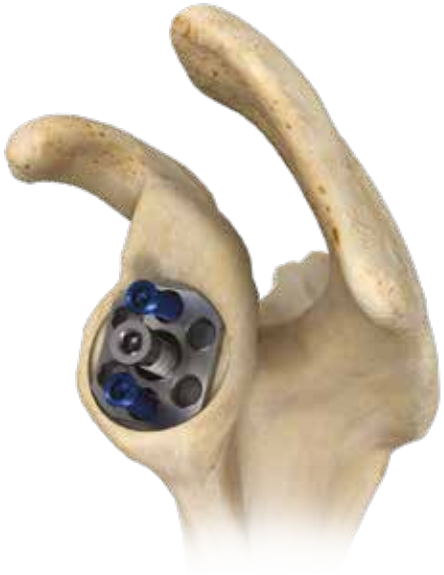


Figure 20

Figure 21

Removal of Glenoid Baseplate

In the event the glenoid baseplate requires removal, utilize the existing glenoid baseplate removal instrument and technique from the Comprehensive Reverse Shoulder System (Figures 20–21).

Note: Written copies of the Comprehensive Anatomic and Comprehensive Reverse Shoulder Systems surgical techniques are available at www.zimmerbiomet.com.

Implant Ordering Information

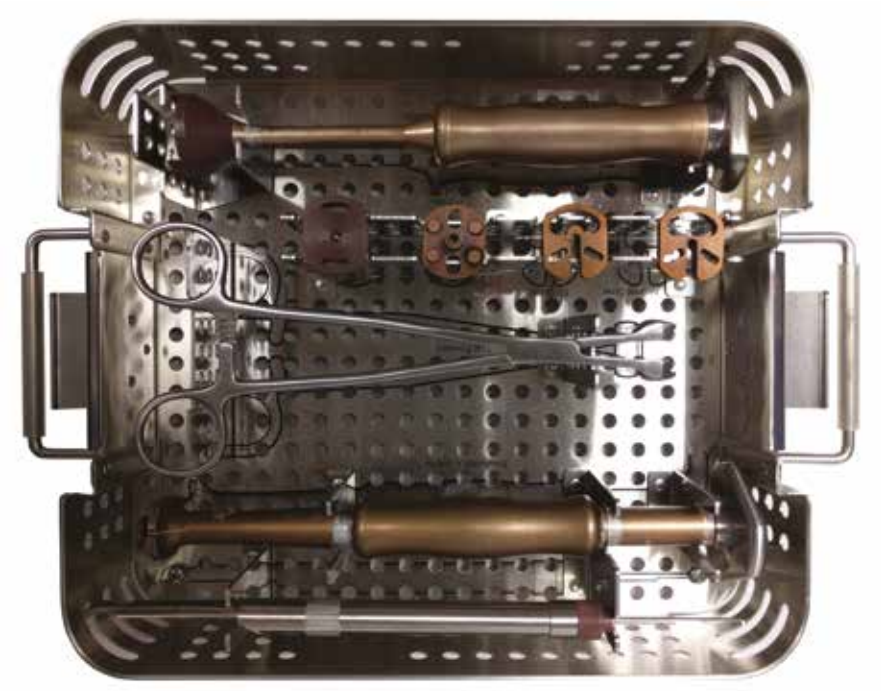
Product	Part Number	Description	Size
	110005273	Comprehensive Convertible Glenoid Baseplate	28 mm
	110035767	Comprehensive Convertible Glenoid Standard Liner Vivacit-E® Highly Crosslinked Polyethylene	28 mm
	115394	6.5 mm Central Screw 3.5 Hex	20 mm length
	115395	6.5 mm Central Screw 3.5 Hex	25 mm length
	115396	6.5 mm Central Screw 3.5 Hex	30 mm length
	115397	6.5 mm Central Screw 3.5 Hex	35 mm length
	115398	6.5 mm Central Screw 3.5 Hex	40 mm length
	115399	6.5 mm Central Screw 3.5 Hex	45 mm length
	115400	6.5 mm Central Screw 3.5 Hex	50 mm length
	180550	4.75 mm Fixed Locking Screw 3.5 Hex	15 mm length
	180551	4.75 mm Fixed Locking Screw 3.5 Hex	20 mm length
	180552	4.75 mm Fixed Locking Screw 3.5 Hex	25 mm length
	180553	4.75 mm Fixed Locking Screw 3.5 Hex	30 mm length
	180554	4.75 mm Fixed Locking Screw 3.5 Hex	35 mm length
	180555	4.75 mm Fixed Locking Screw 3.5 Hex	40 mm length
	180556	4.75 mm Fixed Locking Screw 3.5 Hex	45 mm length
	180557	4.75 mm Variable Non-Locking Screw 3.5 Hex	15 mm length
	180558	4.75 mm Variable Non-Locking Screw 3.5 Hex	20 mm length
	180559	4.75 mm Variable Non-Locking Screw 3.5 Hex	25 mm length
	180560	4.75 mm Variable Non-Locking Screw 3.5 Hex	30 mm length
	180561	4.75 mm Variable Non-Locking Screw 3.5 Hex	35 mm length
	180562	4.75 mm Variable Non-Locking Screw 3.5 Hex	40 mm length
	180563	4.75 mm Variable Non-Locking Screw 3.5 Hex	45 mm length

Instrument Ordering Information

Note: The Convertible Glenoid is of comparable shape to the Standard Reverse Baseplate. Therefore, Standard Reverse Instrumentation is needed for implantation.

Needed for Implantation

- Convertible Glenoid Tray (loaner set 110017161_L)
- Convertible Glenoid Implants (loaner set E_CCG_L)
- Standard Baseplate Instrumentation (loaner set 4058COMP_L)
- Reverse Shoulder Instrumentation (loaner set 110028913_L)



Product	Part Number	Description	Size
	110005281	Comprehensive Convertible Glenoid Pin Sizer Neutral	28 mm
	110005283	Comprehensive Convertible Glenoid Pin Sizer 10° Inferior Tilt	28 mm
	110005285	Comprehensive Convertible Glenoid Trial	28 mm

Product	Part Number	Description	Size
	110005287	Comprehensive Convertible Glenoid Drill Guide Template	28 mm
	110005291	Comprehensive Convertible Glenoid Baseplate Impactor	
	110005294	Comprehensive Convertible Glenoid Liner Impactor	
	110005298	Comprehensive Convertible Glenoid Trial Forceps	
	110005302	Comprehensive Convertible Glenoid Central Screw Depth Gauge	
	110017096	Comprehensive Glenosphere Removal Fork	
	110017161	Comprehensive Convertible Glenoid Instrument Case	
	110017162	Comprehensive Convertible Glenoid Instrument Case Kit	

INDICATIONS

Anatomic Applications

1. Non-inflammatory degenerative joint disease including osteoarthritis and avascular necrosis.
2. Rheumatoid arthritis.
3. Revision where other devices or treatments have failed.
4. Correction of functional deformity.
5. Fractures of the proximal humerus, where other methods of treatment are deemed inadequate.
6. Difficult clinical management problems, including cuff arthropathy, where other methods of treatment may not be suitable or may be inadequate.

Reverse Applications

The Comprehensive Reverse Shoulder is indicated for use in patients whose shoulder joint has a grossly deficient rotator cuff with severe arthropathy and/or previously failed shoulder joint replacement with a grossly deficient rotator cuff. The patient must be anatomically and structurally suited to receive the implants and a functional deltoid muscle is necessary.

The Comprehensive Reverse Shoulder is indicated for primary, fracture, or revision total shoulder replacement for the relief of pain and significant disability due to gross rotator cuff deficiency.

Comprehensive Convertible Glenoid Baseplate components are intended for cementless applications with the addition of screw fixation.

Interlok® finish humeral stems are intended for cemented use and the MacroBond® coated humeral stems are intended for press-fit or cemented application. Humeral components with porous coated surface coating are indicated for either cemented or uncemented biological fixation applications.

CONTRAINDICATIONS

Absolute contraindications include infection, sepsis, and osteomyelitis.

Relative contraindications include:

1. Uncooperative patient or patient with neurologic disorders who is incapable or unwilling to follow directions.
2. Osteoporosis.
3. Metabolic disorders which may impair bone formation.
4. Osteomalacia.
5. Distant foci of infections which may spread to the implant site.
6. Rapid joint destruction, marked bone loss or bone resorption apparent on roentgenogram.

Notes

For indications, contraindications, warnings, precautions, potential adverse effects and patient counselling information, see the package insert or contact your local representative; visit www.zimmerbiomet.com for additional product information. Check for product country clearances and reference product-specific instructions for use.

Zimmer Biomet does not practice medicine. This technique was developed in conjunction with health care professionals. This document is intended for surgeons and is not intended for laypersons. Animations and virtual reality are provided as a visual guide based on surgical techniques; a written copy of the surgical technique is available at www.zimmerbiomet.com or from your local representative. Each surgeon should exercise his or her own independent judgment in the diagnosis and treatment of an individual patient, and this information does not purport to replace the comprehensive training surgeons have received. As with all surgical procedures, the technique used in each case will depend on the surgeon's medical judgment as the best treatment for each patient. Results will vary based on health, weight, activity and other variables. Not all patients are candidates for this product and/or procedure. Caution: Federal (USA) law restricts this device to sale by or on the order of a surgeon. Rx only.

ZIMMER BIOMET
Your progress. Our promise.®

Legal Manufacturer
Biomet Orthopedics
P.O. Box 587
56 E. Bell Drive
Warsaw, Indiana 46581-0587
USA

www.zimmerbiomet.com

0170.2-GLBL-en-Issue Date 2021-08-05