ZIMMER BIOMET

# Identity™ Shoulder System

Reverse Total Shoulder

**Surgical Technique**

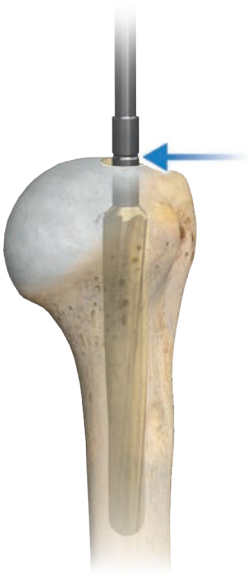
# Table of Contents

## Introduction

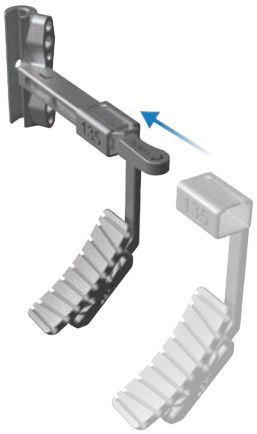
The Identity Shoulder System is a platform system that enables implantation in an anatomic or reverse total shoulder configuration. The system can also be revised from anatomic to reverse while preserving a well-fixed humeral stem. This technique focuses on the surgical steps to implant a reverse total shoulder.

Additionally, the latter part of the technique includes instructions for conversion from anatomic to reverse, as well as explanation of all humeral components.

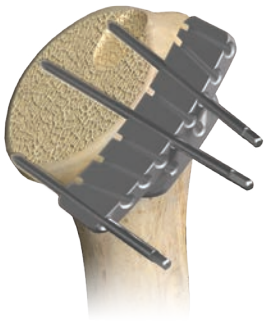
## Surgical Technique Summary



1. Ream



2. Assemble resection guide

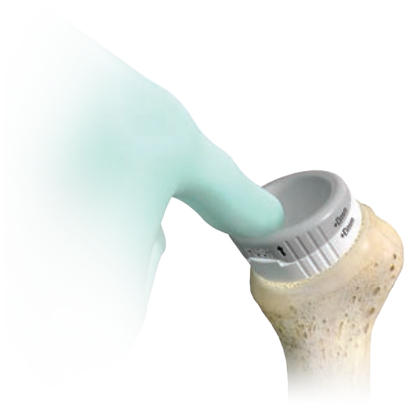


3. Resect humerus

4. Rasp

5. Mate +0mm tray trial to rasp

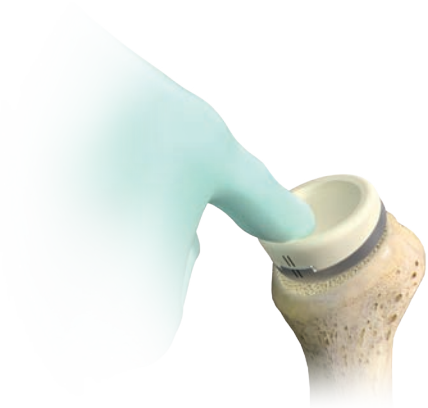

6. Use spacers to select height



7. Mate chosen tray/ bearing trials to rasp

8. Mate tray/stem implants

9. Insert tray/stem assembly into humerus



10. Seat bearing implant by hand

## Intended Use, Indications for Use, and Contraindications.

The Identity™ Shoulder System implants are intended for shoulder joint arthroplasty. Instruments are intended to facilitate the implantation and explantation of the corresponding compatible Zimmer Biomet implants. Instruments cases/trays are intended to facilitate the organization, identification, storage, transportation, and sterilization reprocessing of the compatible Zimmer Biomet Instruments.

### INDICATIONS

Zimmer Biomet Reverse Shoulder products are 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 Zimmer Biomet 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.

The Titanium Glenosphere is indicated for patients with suspected cobalt alloy sensitivity. The wear properties of Titanium and Titanium alloys are inferior to that of cobalt alloy. A Titanium Glenosphere is not recommended for patients who lack suspected material sensitivity to cobalt alloy.

The assembled humeral component may be used alone for hemiarthroplasty or combined with a glenoid component or reverse components for total shoulder arthroplasty (anatomic or reverse applications). The humeral stems may be used cemented or uncemented (biological fixation).

### CONTRAINDICATIONS

This device is contraindicated for the following:

- Local/systemic infection
- Presence of significant injury to the upper brachial plexus
- Paralysis of the axillary nerve
- Marked bone loss
- Nonfunctional deltoid or external rotator muscles
- Any neuromuscular disease compromising the affected limb that would render the procedure unjustifiable

## Pre-Operative Planning

Prior to surgery obtain patient imaging to evaluate bony anatomy for any deformities or acquired bone loss. Recommended x-rays include A/P, scapular Y and axillary views. A CT scan can be used to assess bone quality and identify any glenoid erosion patterns which may affect implant selection. The system includes x-ray templates to determine humeral stem and head sizes prior to surgery.

## Patient Positioning

The arm and shoulder are prepped and draped free. Utilize a modified beach chair position at about 30 to 40 degrees of flexion.

## Incision and Exposure

Utilize an extended deltopectoral anterior incision with an optional biceps tenodesis beginning immediately above the coracoid process and extending distally and laterally, following the deltopectoral groove along the anterior border of the deltoid.

Laterally retract the deltoid muscle, avoiding release of the deltoid from the clavicle. The deltoid may be partially released from its distal insertion by subperiosteal dissection. Make a partial relaxing incision through the proximal coracoid tendon and medially retract the conjoined tendon.

**Note:** A lesser tuberosity osteotomy may also be performed in order to release the subscapularis.

Identify anterior structures and externally rotate the humerus. Make a longitudinal incision through the tendinous portion of the subscapularis muscle and capsule, just medial to the lesser tuberosity. In cases of severe contracture, subscapularis lengthening may be required.

Tag the subscapularis tendon with non-absorbent sutures for easy identification during closure. Externally rotate and extend the humerus to expose the humeral head, while protecting the axillary nerve.

Figure 1

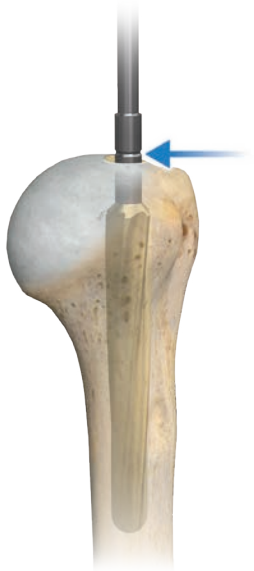


Figure 2

## Humeral Resection

With the head exposed, remove any osteophytes to reveal the articular margin.

Attach a 4mm trocar-tipped Intramedullary Reamer to the T Handle (Figure 1). This system has standard and micro length humeral stems as well as dedicated Intramedullary Reamers for both lengths. Ensure Reamer length corresponds to the intended implant length. Place the trocar tip of the reamer at the superior-most portion of the humeral head and in line with the humeral axis. If necessary, use a mallet to penetrate the cortical bone. Bore through the humeral head until the Reamer teeth are just below the humeral head.

Use progressively larger reamers in 1mm increments until feeling initial resistance in the canal. Insert the Reamer until the engraved groove on the Reamer shaft aligns to the humeral head cortical bone (Figure 2). Note the size of final Reamer used as this will correspond to the final Rasp and humeral stem implant size.

Remove the T-handle, leaving the last Intramedullary Reamer in the canal.


Figure 3

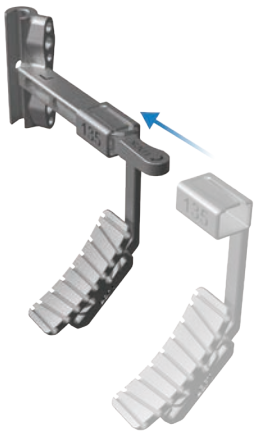


Figure 4

Figure 5

Figure 6

The Identity Reverse humeral tray has a 135° inclination. Ensure the Resection Guide Carriage has a "135" engrave.

To assemble the IM Humeral Resection Guide, do the following steps in order:

Holding the 135° Resection Guide Carriage with the appropriate side etch ("R" for right shoulder, "L" for left shoulder) facing towards you, slide the Resection Block onto the Carriage such that the concave side of the Resection Block will face the humerus (Figure 3).

Hold the Humeral Reamer Shaft Clamp with the appropriate side etch facing up. Slide the rectangular opening of the Resection Guide Carriage onto the Shaft Clamp arm (Figure 4).

If assessing version prior to resection, then advance the threaded 30° Alignment Rod onto the Version Rod Coupling. With the appropriate side engraving mark facing up ("R" for right shoulder, "L" for left shoulder) (Figure 5), thread the version guide assembly into the superior holes of the Humeral Reamer Shaft Clamp. The holes are polarized to ensure proper side orientation.

Attach the assembled IM Resection Guide to the Reamer shaft (Figure 6).


Figure 7

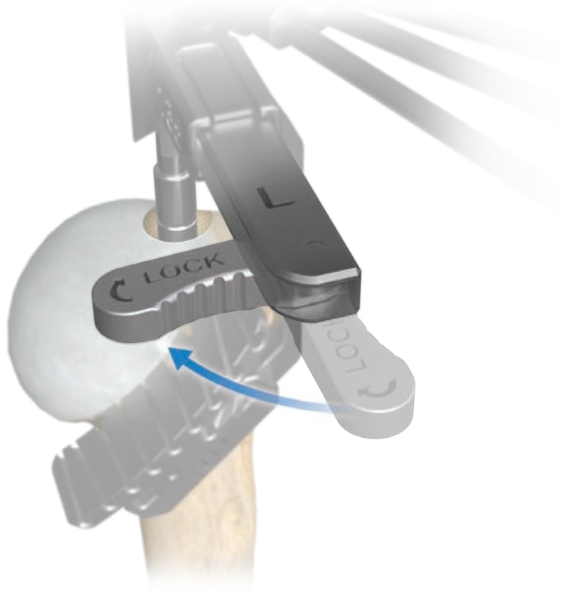



Figure 8

## Humeral Resection

Resection height can be adjusted by sliding the IM Resection Guide assembly up or down the Reamer shaft until the top of the Resection Block aligns to the articular margin. The Reamer depth stop will prevent lowering the resection guide beyond that point. If the depth stop places the resection too high, then reattach the T Handle to the IM reamer and advance the reamer deeper into the canal. If the depth stop places the resection too low, then consider placing an IM reamer one size larger into the canal to enable proper height.

To establish resection version, flex the forearm at 90° and rotate the resection guide assembly until it aligns to the forearm at the desired version (Figure 7). In this example the forearm aligns with the 30° retroversion rod. When the Resection Guide is in the desired position, lock the Shaft Clamp onto the reamer shaft (Figure 8) and slide the Resection Guide Carriage as close to the humerus as possible. Slide the Resection Block against the humerus. The Resection Block is magnetic and will self-adjust to the unique contours of the patients humerus. If desired, place the wide end of the Angel Wing on the Resection Block to assess the planned resection (Figure 9). If resection height appears too shallow and the Shaft Clamp is bottomed out on the Reamer, then advance the Reamer deeper into the humerus as necessary. If resection height appears too deep and the Shaft Clamp is abutting the top of the Reamer, then back out the Reamer enough to enable proper resection height.

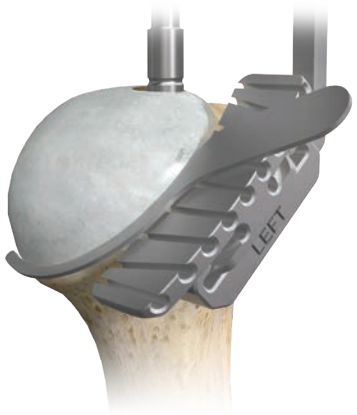



Figure 9

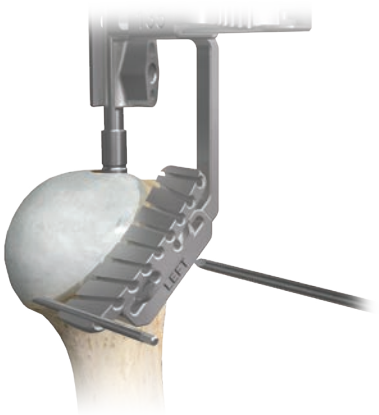



Figure 10


Figure 11

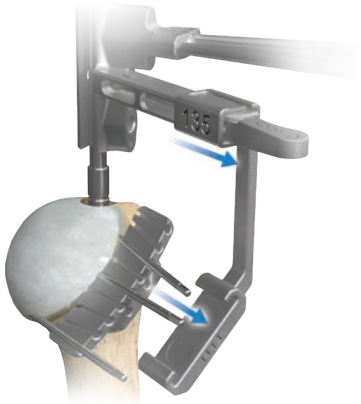



Figure 12

The system has sterile, single-use Hex Pins of 70mm and 100mm lengths. Each box contains three Hex Pins. Place a Hex Pin into the Hex Pin Driver and insert at least three pins through the Resection Block slots until reaching the far cortical wall (Figure 10). Divergent pin slots should be used to maintain fixation against bone. If needed, there are two divergent pin holes below the pin slots in the Resection Block for additional stability. Note: If the lateral-most pin might interfere with Intramedullary Reamer removal, then temporarily back the lateral pin out enough to enable removal.

With one hand on Shaft Clamp and one on the Carriage, unlock the Shaft Clamp (Figure 11), simultaneously disengaging the Carriage from the Resection Block (Figure 12). Remove the shaft clamp from the reamer shaft. Remove the Intramedullary Reamer from the canal.

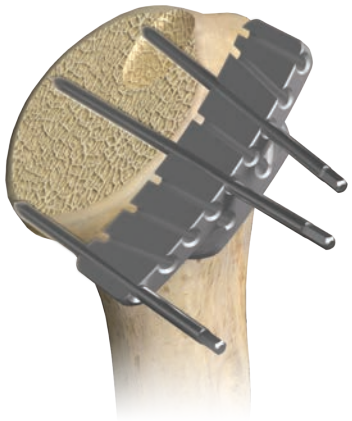


Figure 13


Figure 14

Resect the humeral head by cutting on top of the Resection Block and across the Hex Pins. If after resection, the pins are not visible across the entire resection surface, then resect enough bone to make them visible (Figure 13). A flush resection is important to ensure uniform contact with the Reference Foot which will be used in subsequent surgical steps. Remove the Resection Block from the resected humerus.

### Humeral Rasping

To determine the appropriately sized 135° Reference Foot, select the size based on the last Intramedullary Reamer used (Figure 14):

| IM Reamer | Reference Foot |
|---|---|
| 4-7 | Small |
| 8-16 | Medium |
| 17-20 | Large |


Figure 15a


Figure 15b

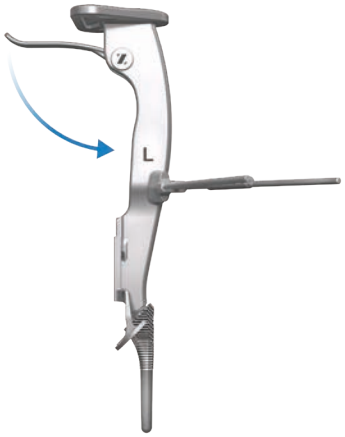



Figure 17

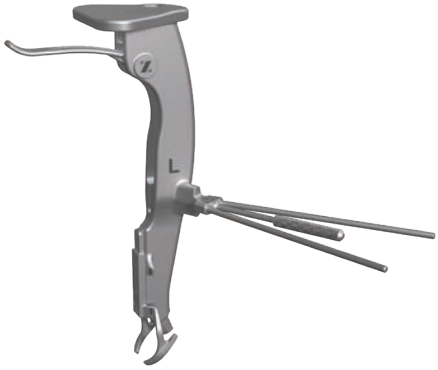



Figure 16

Figure 18

Prior to Rasping, note that the instrument set includes two Inserters with several common features (Figure 15a). The Rasp Inserter has an oval distal tip and lateral side latch to rigidly mate to the Humeral Rasps. The Tray Inserter has a flat plate and lateral side latch which rigidly mate to a reverse humeral tray. Both instruments have differentiating etch marks on the handle.

Attach the Reference Foot to the Humeral Rasp Inserter (Figure 15b). If desired, thread the Version Rod Coupling into the Rasp Inserter hole with the appropriate side engraving ("R" for right shoulder, "L" for left shoulder) facing up (Figure 16). The holes are polarized to ensure proper side orientation.

Select a Humeral Rasp that is three sizes smaller than the last IM Reamer used. With the Inserter handle fully open (Figure 17), align the lateral side of the Rasp with the small hook on the Rasp Inserter tip, and attach the Rasp to the Rasp Inserter. Close the Inserter handle to rigidly affix the Rasp to the Inserter. Slide the Reference Foot down distally and introduce the Rasp into bone (Figure 18).

Figure 19

Figure 20

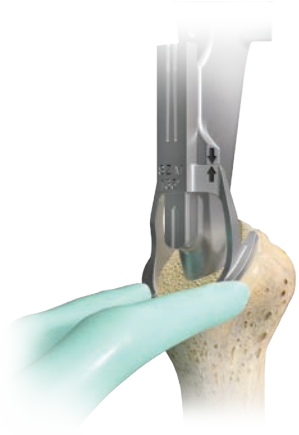


Figure 21

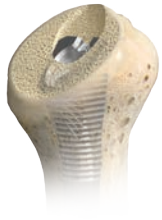


Figure 22

With the Reference Foot in uniform A/P contact with the resection surface (Figure 19), impact the Rasp while maintaining alignment with the bone. The Rasp is fully seated when the Reference Foot engraved arrows make contact with the engraved arrows on the Rasp Inserter (Figure 20). The Reference Foot ensures Rasp seating 5mm below the line of resection while maintaining version alignment with the resected surface.

Sequentially rasp the humerus in 1mm increments, ensuring each Rasp is fully seated. Beginning with the second Rasp, use two fingers to hold the Reference Foot in uniform contact with the resection during Rasp impaction (Figure 21). Rasp until the Rasp size is equal to the last Intramedullary Reamer size. If the final Rasp feels too tight and will not fully seat, then revert back to the previous size Rasp.

If the final Rasp feels unstable, then remove it from the canal and use an Intramedullary Reamer one size larger than previously used. Now rasp using one size larger Rasp.

Disengage the Rasp Inserter from the Rasp, leaving the Rasp in place (Figure 22).

Figure 23a

Figure 23b

Place the appropriately-sized Humeral Protector over the resection during glenoid preparation (Figure 23a). If necessary, gently use a mallet to achieve full seating.

### Reverse Glenoid Preparation

The Identity Shoulder System reverse humeral bearings are compatible with glenospheres from the Comprehensive® Reverse Shoulder System, the Trabecular Metal® Reverse Shoulder System, and the TMR+. For glenoid preparation and trialing instructions, refer to the respective surgical techniques posted on zimmerbiomet.com.

### Humeral Trialing

The Identity Shoulder System includes Standard (STD) and Extended (EXT) humeral trays. The Standard trays are onlay trays which do not require proximal humeral reaming. They come in +0mm, +6mm and +12mm heights. The Extended trays lateralize the humerus by 4mm compared to the Standard trays (Figure 23b). They come in -6mm, +0mm, +6mm and +12mm heights. The -6mm tray is an inset humeral tray which requires proximal humeral reaming. This is the only tray which requires proximal reaming during a primary reverse surgery.

If implanting the -6mm inset humeral tray, proceed to APPENDIX 1 for proximal reaming instructions.

Figure 24


Figure 25


Figure 26


Figure 27

Figure 28

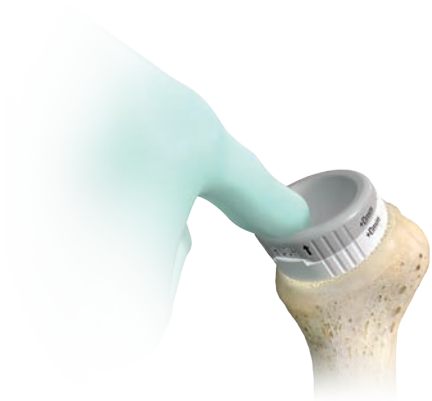


Figure 29

**Option 1 Tray & Bearing Trial Selection:** To quickly determine tray and bearing height, ensure the +0 EXT Humeral Tray Trial is mated to the Rasp (Figure 24). Gently reduce the joint with the arm externally rotated 10-20 degrees. Using the +0 Tray/+0 Bearing end of the Humeral Spacer, slide the Spacer into the joint so that it rests on the Humeral Tray Trial (Figure 25). Assess deltoid tension. If the joint is lax, remove the Spacer and use the +0 Tray/+3 Bearing end of the same Spacer (Figure 26). Use Spacers of progressive height until achieving the desired deltoid tension. Note the tray and bearing markings on the final Spacer used (Figure 27). Insert the appropriate Humeral Tray Trial that corresponds to the tray height noted on the final Spacer used (for example, +6 EXT Tray) into the Rasp. Select the Humeral Bearing Trial that corresponds to the bearing height noted on the final Spacer used (for example, +3 Bearing). If the joint feels too tight with the +0 Tray/+0 Bearing, then proceed to APPENDIX 1 for instructions on implanting a -6mm inset tray.

**Option 2 Tray & Bearing Trial Selection:** Place the appropriate +0 EXT Humeral Tray Trial into the oval hole in the Rasp, ensuring the anti-rotation tab faces medially (Figure 24). To mate the bearing and tray trials, tilt the +0mm Bearing Trial so that the "lateral toe" tucks into the undercut in the Tray Trial (Figure 28). Push down on the medial lip to snap the Bearing Trial in place (Figure 29).

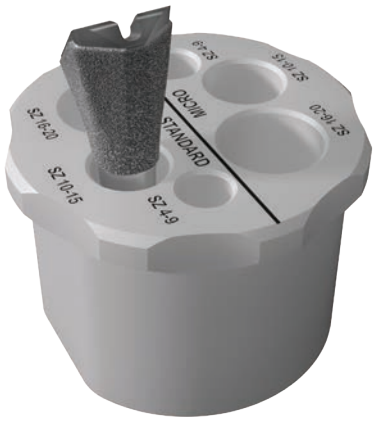



Figure 30

Figure 31a


Figure 31b

Reduce the joint to assess deltoid tension and range of motion. The joint should be stable throughout the range of motion. If the joint feels too lax, then use a +3mm Bearing Trial. To disengage the bearing trial, use thumb pressure on "Push" engraving on the medial side of the trial. If the joint still feels lax, then insert a +6mm Humeral Tray Trial. Continue progressively building up height in the Tray/Bearing Trials until attaining appropriate tension. If the joint feels too tight, then decrease the Tray/Bearing Trial height combination by 3mm. Alternately, the humerus can be medialized by 4mm by switching to the STD version of the same height (for example, switching from a +6mm EXT tray to a +6mm STD tray). The trial reduction should show limited distraction (1 mm or less).

**Note:** For cases of extreme instability, Retentive Humeral Bearings are available. Retentive Bearings capture more of the glenosphere and have polyethylene walls which are 2–3 mm higher than standard +3 mm Bearings, but do not add any additional joint space.

### Humeral Component Implantation

Disengage the Humeral Tray and Bearing Trials from the Rasp. After removing the Reference Foot from the Rasp Inserter, attach the Rasp Inserter to the Rasp and remove it from the humerus. If the Rasp Inserter will not engage the Rasp, then go to APPENDIX 5 - Removing a stuck Rasp/Stem.

If press-fitting, select a humeral stem implant size that matches the last Rasp used. If cementing, select a humeral stem two size smaller than the last Rasp used. Place the humeral stem into the appropriate hole in the Back Table Assembly Block (Image 30). The assembly block has 3 holes each for standard and micro length stems, labeled with the humeral stem sizes that fit into each hole. Take care to place the stem in the correct hole for your desired stem length.

**Caution:** If the stem is inserted into a hole which is too small in diameter, the stem may get stuck in the Assembly Block.

Select a humeral tray implant that corresponds to the final Humeral Tray Trial used previously. Using the Humeral Tray Inserter with the handle fully open (Image 31a), attach the humeral tray implant to the Inserter with the medial etch mark on the Inserter aligned to the anti-rotation tab on the Humeral Tray implant (Image 31b). Close the Inserter handle to rigidly affix the implant in place.

Figure 32

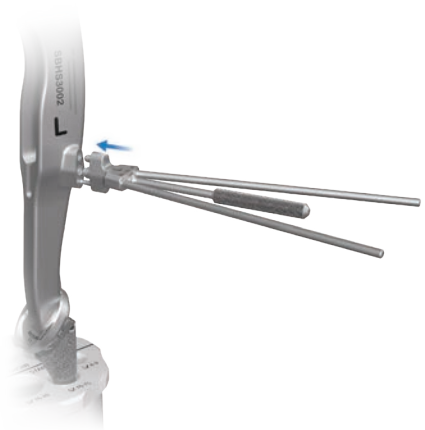


Figure 33

Figure 34


Figure 35

Place the Humeral Tray implant into the Humeral Stem with the suture hole fin aligned laterally (Figure 32). Using a mallet, firmly strike the Inserter until the taper junction is secure. Remove the Humeral Stem/Humeral Tray construct from the Back Table Assembly Stand. If desired, thread the Version Rod Coupling into the Humeral Tray Inserter hole with the appropriate side engraving ("R" for right shoulder, "L" for left shoulder) (Figure 33).

If press-fitting, insert the implant into the canal. Impact until the stem/tray assembly is fully seated (Figure 34).

If cementing, use lavage and suction to clean the humeral canal. Dry the canal and retrograde fill it with doughy cement. Insert the implant into the canal. Impact until the stem is fully seated. Remove all excess cement. Allow the cement to fully cure prior to implanting the Humeral Bearing.

Align the selected Humeral Bearing implant double etch marks to the medial double etch marks on the Humeral Tray implant (Figure 35).

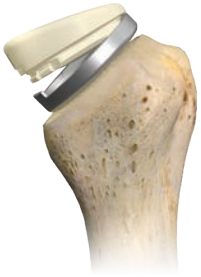


Figure 36

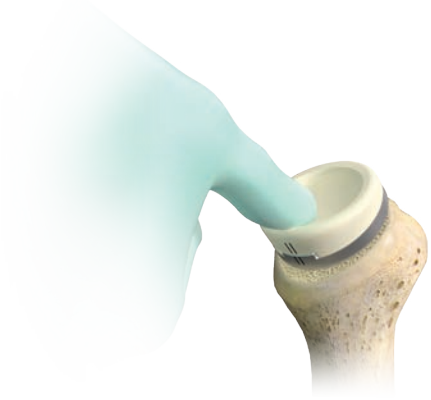


Figure 37

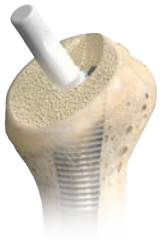


Figure 38

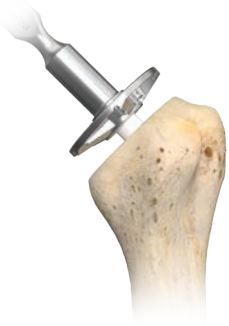


Figure 39

Tilt the Bearing so that the lateral "toe" engages into the lateral undercut of the Humeral Tray (Figure 36). Using finger pressure, press down on the medial side of the Bearing to seat the implant (Figure 37). The Humeral Bearing will make an audible click when it fully seats into the Humeral Tray.

## APPENDIX 1 - HUMERAL PREPARATION AND TRIALING – INSET HUMERAL TRAY

- Remove the Humeral Protector. Place the Neutral Tray Reamer Guide into the oval taper of the Humeral Rasp (Figure 38). Attach the Humeral Tray Reamer to power or a T-Handle. Slide the Humeral Tray Reamer over the Reamer Guide. Lift the Reamer off the resection surface and begin rotating prior to contacting bone. Ream until bottoming out on the smooth proximal surface of the Rasp (Figure 39).

- Disengage the Tray Reamer Guide from the Rasp. If implanting a small humeral stem, there may be a thin wafer of A/P bone adjacent to the Rasp. Use Rongeurs to remove the bone wafer.

Figure 40


Figure 41

Figure 42

Place the -6mm neutral Humeral Tray Trial into the Rasp (Figure 40). Humeral Bearings are size-matched to the chosen Glenosphere size (36 or 40mm) and come in +0mm and +3mm heights. Tilt the Bearing Trial so that the "lateral toe" tucks into the lateral undercut in the Tray Trial (Figure 41). Using thumb pressure, push down on the medial lip to snap the Bearing Trial in place (Figure 42).

Reduce the joint to assess deltoid tension and range of motion. The joint should be stable throughout the range of motion. If the joint feels too lax, then switch to a +3mm Bearing Trial. To disengage the bearing trial, use thumb pressure on "Push" engraving on the medial side of the trial. If the joint still feels lax, then insert a +0mm Humeral Tray Trial. Continue progressively building up height in the Tray/Bearing Trials until attaining appropriate tension. If the joint feels too tight, then decrease the Tray/Bearing Trial height combination. Continue progressively reducing height until attaining appropriate tension.

**Note:** For cases of extreme instability, Retentive Humeral Bearings are available. Retentive Bearings capture more of the glenosphere and have polyethylene walls which are 2– 3 mm higher than standard Bearings, but do not add any additional joint space.


Figure 43


Figure 44


Figure 45

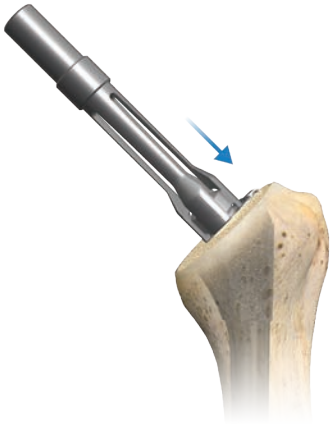


Figure 46

## APPENDIX 2 - CONVERSION FROM ANATOMIC TO REVERSE

### Humeral Head and Adapter Removal

From the anterior side of the humerus, align the Humeral Head Remover Base to the head implant underside (Figure 43). Using a mallet, strike the Remover Base to advance it along the Head underside until the slot in the instrument makes contact with the humeral adapter implant. Slide the Thin Humeral Head Remover into the Base and strike with a mallet until the head dissociates (Figure 44). If necessary, progress to the Thick Humeral Head Remover. Discard the humeral head implant.

With the humeral adapter exposed, use the Straight Osteotome to clear away bone or cement around the proximal medial area around the humeral stem. The full anterior, posterior and medial surfaces of the Stem must be visible for the Remover to work (Figure 45). Slide the Adapter Remover Collet over the adapter taper until it snaps into place (Figure 46). The base of the adapter implant taper has a circumferential groove. The Collet has an internal lip that will engage this groove.

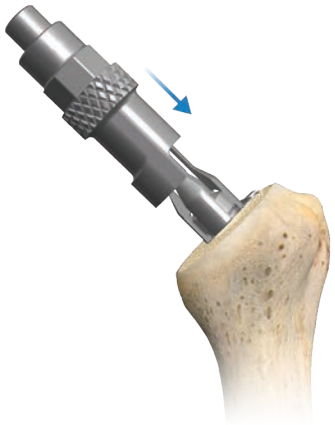


Figure 47

Figure 48

Figure 49

Figure 50

The Adapter Remover Sleeve comes in 135° and 125° versions. The 125° version is used to explant a 125° humeral adapter. All other adapter implants require use of the 135° Remover Sleeve. Place the appropriate Adapter Remover Sleeve over the Remover Collet (Figure 47). The Remover Sleeve should be oriented with the flange aligned medially. The Sleeve should bottom out when contacting the anterior, posterior and medial surfaces of the humeral stem.

Thread the Humeral Revision Nut onto the Remover Collet until hand tight (Figure 48). If the Nut will not thread onto the Collet, either the parts are rotationally misaligned or there is bone or cement that must be removed around the A/P or medial sides of the stem.

With a Revision Wrench aligned medial, slide the Wrench onto the Remover Sleeve with flat sides mating (Figure 49). Place a second Wrench onto the Revision Nut at 45° counterclockwise to the first Wrench (Figure 50). Holding the bottom Wrench stationary in one hand, rotate the top Wrench medially in an effort to disengage the adapter from the stem. Do not rotate the top wrench past the bottom wrench. If necessary, reposition the top wrench to its original 45° position and repeat until adapter disengagement.

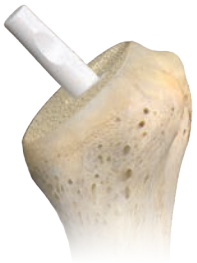


Figure 51


Figure 52a

Figure 52b

### Proximal Humeral Preparation

If humeral stem version is acceptable, place the Tray Reamer Guide Neutral into the oval taper of the humeral stem (Figure 51).

- **If implanting an inset humeral tray**, then attach the silver Humeral Tray Reamer to power or a T-Handle. Slide the Humeral Tray Reamer over the Reamer Guide. Lift the Reamer off the resection surface (Figure 52a) and begin rotating prior to contacting bone. Ream until bottoming out on the Reamer Guide. Proceed to the **Proximal Humeral Trialing – inset Humeral Trays** section of the technique for subsequent surgical steps.
- **If implanting an onlay humeral tray**, then attach the gold Humeral Tray Onlay Reamer to power or a T-Handle (Figure 52b). Slide the Humeral Tray Reamer over the Reamer Guide. Lift the Reamer off the resection surface and begin rotating prior to contacting bone. Ream until bottoming out on the Reamer Guide. Proceed to the **Proximal Humeral Trialing – Onlay Humeral Trays** section of the technique for subsequent surgical steps.

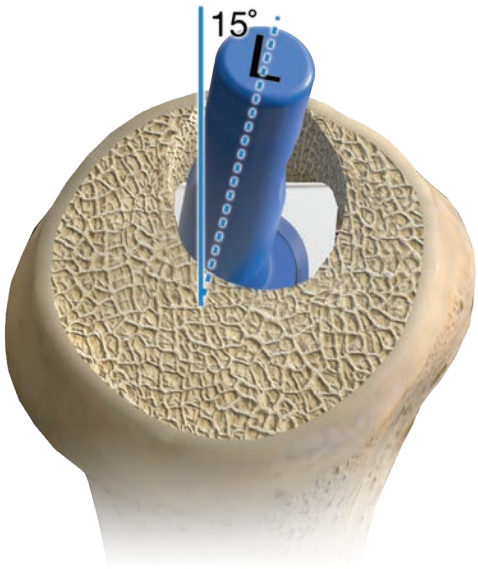



Figure 53a

If humeral stem version needs to be reduced, place the side appropriate (Right or Left, based on operative arm) Humeral Tray Reamer Guide into the oval taper of the humeral stem (Figure 53a). The Right and Left Reverse Reamer Guides will decrease retroversion by 15°. Ream the proximal bone with the silver Humeral Tray Reamer. Note: The left and right Humeral Tray trials and implants come in -6mm and +0mm heights. Be certain to select the appropriate side humeral tray trial and implant.

Place the appropriate Humeral Tray Trial into the Humeral Stem. Humeral Bearings are size-matched to the chosen Glenosphere size (36 or 40mm) and come in +0mm and +3mm heights. Tilt the Bearing Trial so that the "lateral toe" tucks into the lateral undercut in the Tray Trial. Using thumb pressure, push down on the medial lip to snap the Bearing Trial in place.

Reduce the joint to assess deltoid tension and range of motion. The joint should be stable throughout the range of motion. If the joint feels too lax, then switch to a +3mm Bearing Trial. To disengage the bearing trial, use thumb pressure on "Push" engraving on the medial side of the trial. If the joint still feels lax, then insert a taller Humeral Tray Trial. Continue progressively building up height in the Tray/Bearing Trials until attaining appropriate tension. If the joint feels too tight, then decrease the Tray/Bearing Trial height combination. Continue progressively reducing height until attaining appropriate tension.

**Note:** For cases of extreme instability, Retentive Humeral Bearings are available. Retentive Bearings capture more of the glenosphere and have polyethylene walls which are 2–3 mm higher than standard Bearings, but do not add any additional joint space.

Figure 53b

Using the Humeral Tray Inserter with the handle fully open, attach the selected humeral tray implant to the Inserter with the medial etch mark on the Inserter aligned to the anti-rotation tab on the Humeral Tray implant. Close the Inserter handle to rigidly affix the tray implant in place.

Place the Humeral Tray implant into the Humeral Stem with the suture hole fin aligned laterally (Figure 53b). Using a mallet, firmly strike the Inserter until the taper junction is secure.

Align the selected Humeral Bearing implant double etch marks to the medial double etch marks on the Humeral Tray implant. Tilt the Bearing so that the lateral "toe" engages into the lateral undercut of the Humeral Tray. Using finger pressure, press down on the medial side of the Bearing to seat the implant. The Humeral Bearing will make an audible click when it fully seats into the Humeral Tray.

Figure 54

Figure 55

Figure 56

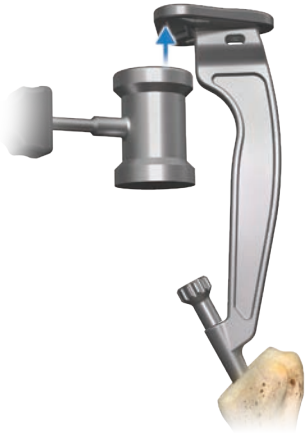


Figure 57

## APPENDIX 3 - HUMERAL STEM REMOVAL

If the humeral stem needs to be explanted, use the Osteotomes to dissociate proximal bone from the implant. The Straight Osteotome can be used along the anterior, lateral and posterior sides of the implant (Figure 54). The Curved Osteotome can be used along the medial side of the implant (Figure 55).

Over the back table, thread the Extractor Bolt into the Humeral Rasp/Stem Extractor. In axial alignment to the humeral canal, thread the Rasp/Stem Extractor to the humeral stem using the Extractor Bolt (Figure 56), tightening by hand. If necessary, use the 3.5mm Hex Driver to fully tighten the Extractor Bolt. Using a mallet, strike the underside of the Extractor to remove the humeral stem (Figure 57). If greater force is required to remove the stem, the Comprehensive Shoulder System Slide Hammer can be threaded into the Extractor.


Figure 58

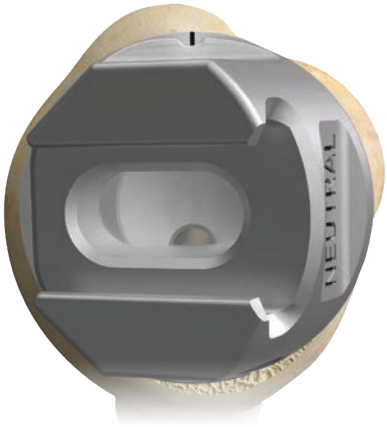



Figure 59


Figure 60

## APPENDIX 4 - REVERSE REVISION

If a reverse humeral tray needs to be revised, use an osteotome to lever out the bearing implant. Use caution to avoid the medial anti-rotation tab on the humeral tray.

Determine which humeral tray implant is in place based on the etch marking: Neutral, Left or Right. Select a Humeral Tray Remover Base that corresponds to the tray implant (Figure 58).

Position the Remover Base so that the cut-in aligns. with the single etch mark on the lateral side of the humeral tray (Figure 59). Rotate the Remover Base clockwise 90° so that the side etching (Neutral, Left or Right) is aligned medially (Figure 60).


Figure 61

Figure 62

Figure 63

Figure 64

Using one hand, insert the Tray Remover Slider into the Remover Base channel (Figure 61). Using the other hand, insert the Tray Remover Threaded Rod through the Slider and into the humeral tray implant (Figure 62). Tighten the Threaded Rod by hand until fully seated into the humeral stem.

**Caution:** The Tray Remover Base does not have a stop to prevent the Slider from disengaging. Manually hold the Slider in place while inserting the Threaded Rod to establish definitive engagement.

Place a Humeral Revision Wrench on the Slider aligned medially (Figure 63). Place a second Wrench on the Threaded Rod aligned clockwise (Figure 64) at a 45° angle to the first wrench. Rotate the top Wrench medially in an effort to disengage the humeral tray from the stem. Do not rotate the top wrench past the bottom wrench. If necessary, reposition the top wrench to its original 45° position and repeat until tray disengagement.

Figure 65

Figure 66

## APPENDIX 5– REMOVING A STUCK RASP/STEM

In the event a Rasp gets stuck in the humerus, it can be removed using the Rasp/Stem Extractor from the Revision Instrument case. Thread the Extractor Bolt through the Rasp/Stem Extractor (Figure 65). Thread the Rasp/Stem Extractor to the Rasp and tighten using the Hex Driver (Figure 66). Using a mallet, strike the underside of the Rasp/Stem Extractor to remove the Rasp. If greater force is required to remove the stem, the Comprehensive Shoulder System Slide Hammer can be threaded into the Extractor.

## Magnet Usage and Symbols

### MAGNET USAGE

Warning: Some instruments in the Identity Shoulder System contain magnets. These include the 135° and 125° Resection Guide Carriages, Resection Block Extension Post and Hex Pin Driver. **All magnetic instruments should be kept at a safe distance from a patient's active implantable medical device(s) (i.e. pacemaker)**. These types of devices may be adversely affected by magnets. Instruments containing magnets should be kept on an appropriate table or stand when not in use at the surgical site.

### SYMBOLS

Symbols have been established for the following:

| | |
|---|---|
| LEFT | L |
| RIGHT | R |
| NEUTRAL | NEU |
| SIZE | SZ |
| SMALL | S |
| MEDIUM | M |
| LARGE | L |
| BEARING | BRNG |
| RETENTIVE | RET |
| MICRO | MIC |
| STANDARD | STD |
| EXTENDED | EXT |

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**Legal Manufacturer**
Zimmer, Inc.
1800 W. Center Street
Warsaw, IN 46580
USA

**www.zimmerbiomet.com**