



Anatomical Shoulder™ Bipolar

Surgical Technique



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Preoperative Planning

The *Anatomical Shoulder* Bipolar is indicated for hemi shoulder replacement (humeral side). As a salvage solution in situations where a Zimmer *Anatomical Shoulder* Inverse/Reverse Prosthesis was originally planned, but it is intraoperatively found that the attachment of the Zimmer *Anatomical Shoulder* Inverse/Reverse Glenoid Fixation is not possible.

See also Preoperative Planning *Anatomical Shoulder* Inverse/Reverse Surgical Technique, Lit.No. 06.01276.012.



Template Options

- *Anatomical Shoulder* Humeral Stem, Cemented/Uncemented
Lit. No. 06.01313.000
- *Anatomical Shoulder* Fracture Stems, Cemented
Lit. No. 06.01357.000
- *Anatomical Shoulder* Bipolar Heads
Lit. No. 06.02159.000

Instruments and additional surgical techniques for a last salvage / Anatomical Shoulder Bipolar surgery

The following instrument trays are needed:

Instrument trays

| | | Anatomical Shoulder Bipolar Tray ZS.01.04223.000 | Anatomical Shoulder Inverse/Reverse Tray ZS.01.04229.000 | Anatomical Shoulder Standard Tray I ZS.01.04230.111 | Anatomical Shoulder Glenoid Tray ZS.01.04230.030 | Anatomical Shoulder Revisions Tray ZS.01.04230.142 | Anatomical Shoulder Fracture Tray ZS.01.04237.000 | Anatomical Shoulder Fracture Revision Tray ZS.01.04237.001 | Surgical Technique Inverse/Reverse Lit.No. 06.01276.012 |
|---|---|---|---|--|---|---|--|---|--|
| Hemi shoulder replacement | Anatomical Shoulder Bipolar | ● | ● | ● | ● | | | | ○ |
| | Anatomical Shoulder Bipolar with Anatomical Shoulder Fracture Stems | ● | ● | | ● | | ● | | ○ |
| From Anatomical Shoulder Inverse/Reverse to Anatomical Shoulder Bipolar | | ● | ● | | ● | ● | | | |
| From Anatomical Shoulder Fracture to Anatomical Shoulder Bipolar | | ● | | | | | ● | | |

Anatomical Shoulder Bipolar, Hemi Shoulder replacement surgery

Humerus preparation

The humeral head resection steps from the *Anatomical Shoulder Inverse/Reverse* surgical technique must be performed (Lit.No. 06.01276.012, pages 7–9).

Now, the *Anatomical Shoulder* rasp is properly seated. The humerus is prepared (Fig. 1).



Fig. 1

Procedure to define head size and neck length by trial implants

Prior to implanting the humeral component, a trial reduction and check for range of motion should be performed.

Start with the trial head (Ø 42, Ø 45, Ø 48, Ø 51, Ø 53) and adapter with corresponding neck lengths (M, L, or XL) (Fig. 2) from the preoperative planning (p. 4).



Fig. 2

Attach the selected Trial Head to the Rasp, which is seated in the Humeral Shaft (Fig. 3).



Fig. 3

Reduce the joint and check the fit on both the superficial and deep surfaces. Applied pressure to the appropriate humeral head will sublux the head about 50 percent of its diameter posteriorly and inferiorly, falling back into place when the pressure is released. A head that does not fill the subacromial area will dislocate and one that overstuffs the joint will not allow this “50-50” laxity assessment. If the fit is too tight, release the tendon as necessary (Fig. 4).

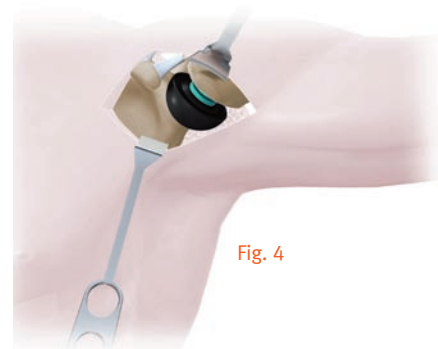


Fig. 4

Remove the trial head and separate the inner adapter with the help of the adapter remover device (Fig. 5).



Fig. 5

Assembly of the bipolar components and the bipolar adaptor

Unpack the corresponding shell, insert and head based on previously used trial head and adapter from the Sizing and Consideration Table.

First place the PE insert on the bipolar humeral head. The slotted PE insert will expand to allow seating of the head and contract then to capture the head (Fig. 6, 1st step). You will hear a “popping” sound. Snap the metal shell over the PE insert and the captured head by holding the metal shell parallel over the PE insert (Fig. 6, 2nd step). Turn it until the knobs of the PE insert fit into the flutes of the metal shell. Press the components together and the metal locking ring will snap into the corresponding groove (Fig. 6).

Fig. 6

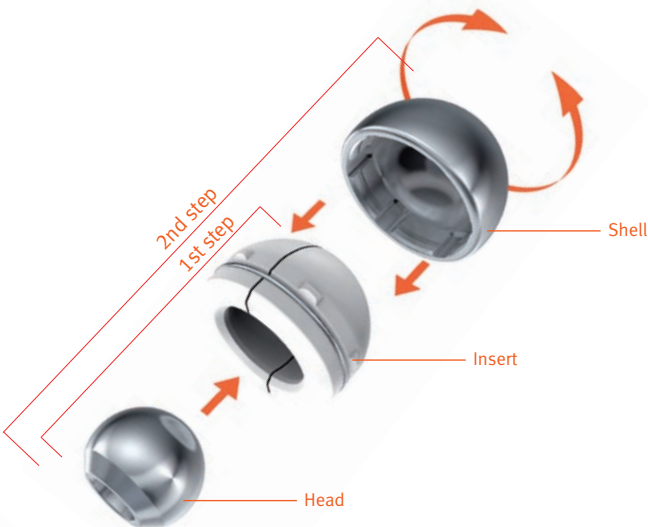
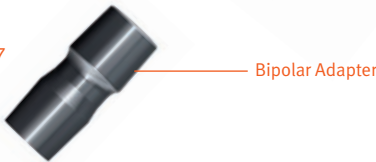


Fig. 7



Unpack the *Anatomical Shoulder* Bipolar Adapter (Fig. 7).

Unpack the definitive *Anatomical Shoulder* Humeral Stem size determined by the size of the last modular rasp (Fig. 8).

Fig. 8



Sizing and Consideration Table

| Trials | Trial Head | 42 | | | 45 | | | 48 | | | 51 | | | 53 | | |
|----------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | Trial Adaptor | M | L | XL | M | L | XL | M | L | XL | M | L | XL | M | L | XL |
| Implants | Shell | 42 | 42 | 42 | 45 | 45 | 45 | 48 | 48 | 48 | 51 | 51 | 51 | 53 | 53 | 53 |
| | Insert | 42 | 42 | 42 | 42 | 42 | 42 | 46 | 46 | 46 | 50 | 50 | 50 | 50 | 50 | 50 |
| | Head | M | L | XL | M | L | XL | M | L | XL | M | L | XL | M | L | XL |

The humeral implant stem is now placed into the stem holder of the assembled mounting block. Place the *Anatomical Shoulder* Bipolar Adaptor (Fig. 9, 1st step) and the assembled Bipolar Head (Fig. 9, 2nd step) onto the humeral implant stem.

The head and the adaptor are now finally impacted onto the humeral implant stem with the aid of the automated impactor (Fig. 10).

Note

Two impacts with the automated impactor are recommended. Align impacts to taper axis. The automated impactor shall be pre-loaded by hand, meaning that the handle of the automated impactor is pressed against the humeral head (maximal compression Fig. 10) until spring stop before the impact is released.

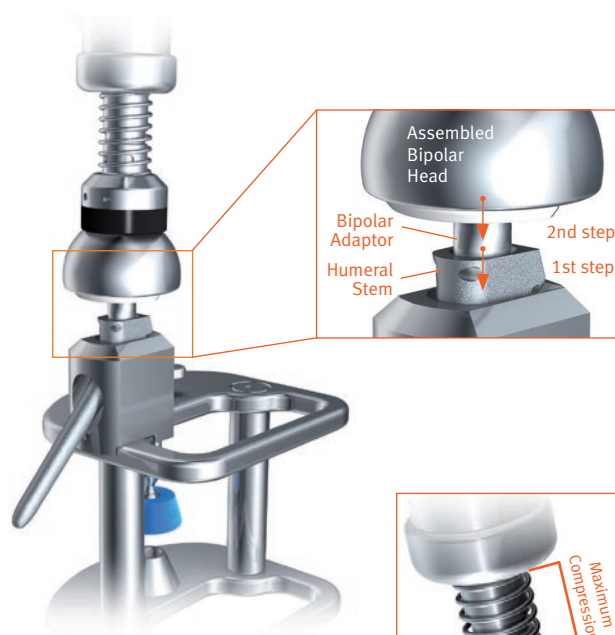


Fig. 9



Fig. 10

The modular rasp can now be removed from the humerus (Fig. 11). If the rasp screw has been used it must be removed first. The rasp handle cannot be mounted without removing this screw.



Fig. 11

If the rasp handle can not be attached, the modular rasp can also be removed from the humerus by means of the rasp extraction instrument (Fig. 12).



Fig. 12

Implantation of the prosthesis into the humeral shaft

With the cemented prosthesis, a cement restrictor can be inserted into the humerus, followed by the cement, in a relatively fluid consistency.

The implant is now inserted into the humerus (Fig. 13), by applying controlled force with the thumb on the head.

Note

If it is not possible to seat the press-fit/ uncemented implant with the thumb until you reached a maximum of 1cm distance (Fig. 14) between proximal humerus resection line and the 45° stem surface, extract the implant and re-ream with the last rasp size used. The lateral stem fin is used as orientation.

The implant is brought into the final position with careful blows on the Impactor for adaptor and head (Fig. 15). This is done until the 45° stem surface is plane with the humerus resection surface (Fig. 16).

If the cemented prosthesis is being used, excess cement is then carefully removed.

The prosthesis is then reduced and stability is checked (Fig. 17).



Fig. 13

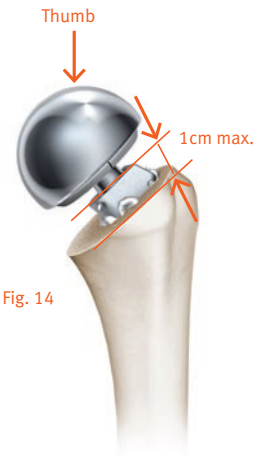


Fig. 14



Fig. 15

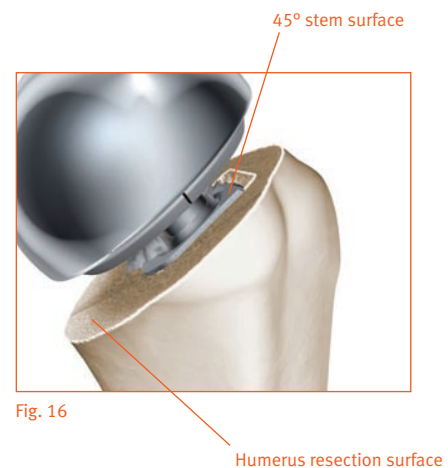


Fig. 16



Fig. 17

From Anatomical Shoulder Inverse/Reverse to Anatomical Shoulder Bipolar

To remove a Humeral Cup from the *Anatomical Shoulder Stem*, slide the Humeral Cup extractor for Humeral Cup between the humeral shaft and the undersurface of the Humeral Cup. Firmly tap the movable part of the instrument to loosen the Cup (Fig. 18).

Note

Significant retro version of the existing humeral stem which results in a poor anatomical alignment should be corrected by revision and reorientation of the humeral stem.



Anatomical Shoulder
Inverse/Reverse



Fig. 18

Preparation and cleaning of the stem

To remove the cement from the thread if the humeral stem is cemented, a drill jig is first inserted into the oval cone of the humeral stem and then used to guide the drill (Fig. 19).

Note

Care should be taken to ensure that drilling is continued as far as possible.

Note

Instruments are from Revision Tray (see p. 5).

Any remaining cement is now removed from the thread of the stem with the thread reamer (Fig. 20).

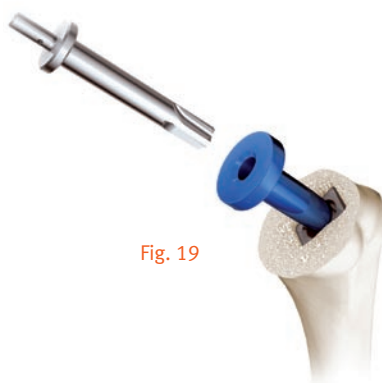


Fig. 19



Fig. 20

The x-pin is now screwed into the humeral stem (Fig. 21). The x-pin guides the reamer and is essential for directing and fixing the inverse humeral cup.

Note

Care should be taken to ensure that the x-pin is fully screwed in and that the oval internal cone is not damaged when this happens.

To remove the cement above the oval cone, use the RH reamer (Fig. 22). Reaming is performed with the cannulated handle from the glenoid tray.



Fig. 21



Fig. 22

Removal of the Glenoid components

To remove the Glenoid Head from the Glenoid Base Plate, slide the extractor instrument for Glenoid Head between the back surface of the Glenoid Head and the front surface of the Glenoid Base Plate. Tap the end of the instrument to loosen the Glenoid Head (Fig. 23 and 24). To remove the Glenoid base plate remove first the locking screws and the inverse screws (Fig. 25). The base plate can be removed by a chisel.

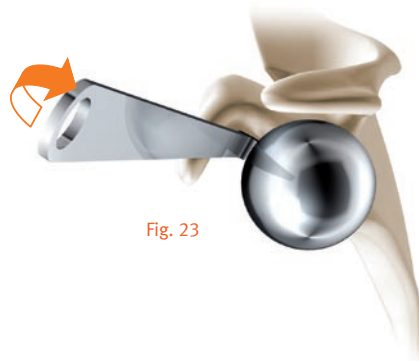


Fig. 23



Fig. 24

Note

For a loosed base plate remove the screws before pulling out the base plate

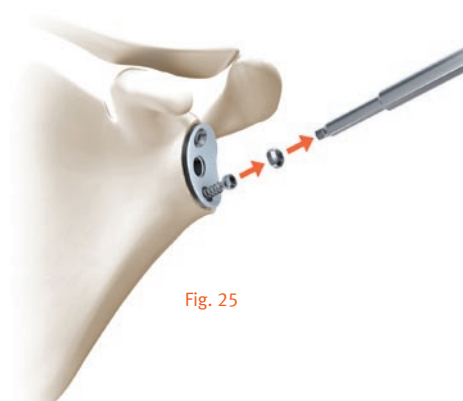


Fig. 25

Procedure to Define a Head Size and Neck length by Trial Implants

Prior to implanting the humeral component, a trial reduction and check for range of motion should be performed. Start trial head (Ø 42, Ø 45, Ø 48, Ø 51, Ø 53) and adapter with corresponding neck lengths (M, L, or XL) (Fig. 26) from the preoperative planning (p. 4).



Fig. 26

Reduce the joint and check the fit on both the superficial and deep surfaces. Applied pressure to the appropriate humeral head will sublux the head about 50 percent of its diameter posteriorly and inferiorly, falling back into place when the pressure is released. A head that does not fill the subacromial area will dislocate and one that overstuffs the joint will not allow this "50-50" laxity assessment. If the fit is too tight, release the tendon as necessary (Fig. 28).

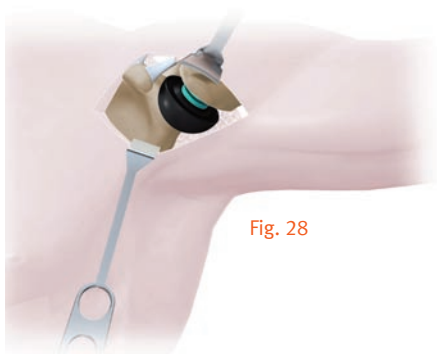


Fig. 28

Attach the selected Trial Head to the humeral stem, which is seated in the Humeral Shaft (Fig. 27).



Fig. 27

Remove trial head and separate the inner adapter with the help of the adapter remover device (Fig. 29).



Fig. 29

Assembly of the Bipolar components and the Bipolar adaptor

Unpack the corresponding shell, insert and head based on previously used trial head and adapter from the Sizing and Consideration Table.

First place the PE insert on the bipolar humeral head. The slotted PE insert will expand to allow seating of the head and contract then to capture the head (Fig. 30, 1st step). You will hear a “popping” sound. Snap the metal shell over the PE insert and the captured head by holding the metal shell parallel over the PE insert (Fig. 30, 2nd step). Turn it until the knobs of the PE insert fit into the flutes of the metal shell. Press the components together and the metal locking ring will snap into the corresponding groove (Fig. 30).

Fig. 30

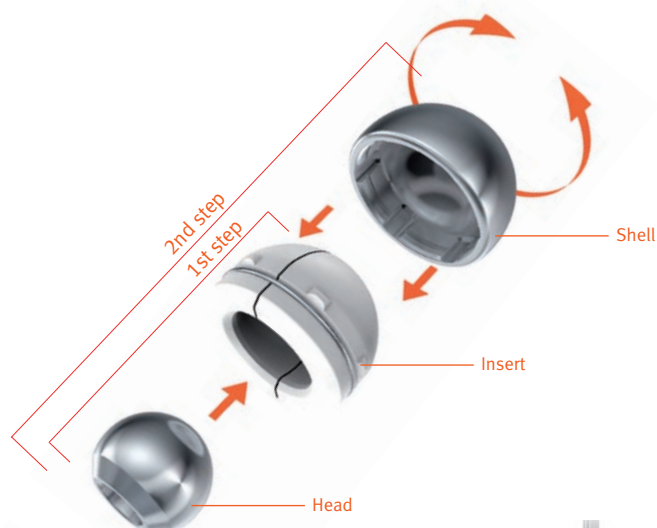


Fig. 31

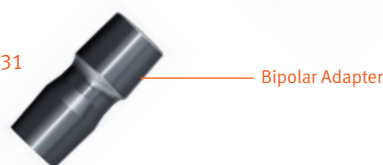
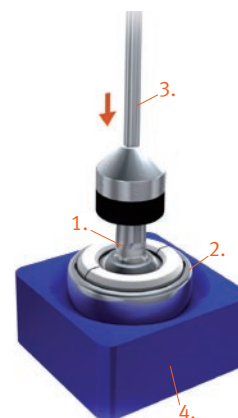


Fig. 32



Unpack the AS Bipolar Adaptor (Fig. 31). Place the *Anatomical Shoulder* Bipolar Adaptor (Fig. 32, 1.) into the Bipolar Head (Fig. 32, 2.) and press the components together for primary fixation.

Place the assembled head/adapter into the “assembly block” (Fig. 32, 4.).

To achieve a strong connection between adaptor and head use the impactor for adaptor and head (Fig. 32, 3.) and impact minimum 3 times with a hammer (Fig. 32). The bipolar head must be fixated by hand while impacting.

Place the assembled head/adapter into the humeral stem seated in the humeral shaft and impact minimum three times by adequate strokes to the bipolar head via the manual impactor (Fig. 33).

Note:

- All taper surfaces must be dry and clean to achieve a good taper connection.
- It is important to achieve a firm connection of the taper interfaces. If the bone quality is good, three strong mallet blows should be applied to achieve connection. If the bone is weak and there is a risk of humeral fracture during impaction, then four or more firm blows should be applied.

Fig. 33



Sizing and Consideration Table

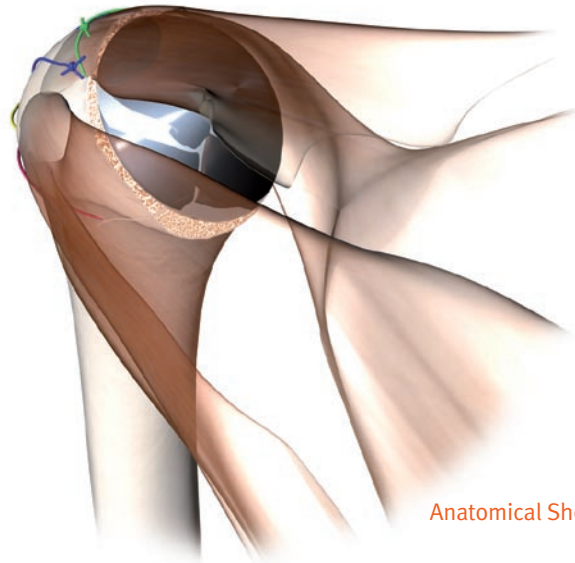
| Trials | Trial Head | 42 | | | 45 | | | 48 | | | 51 | | | 53 | | |
|----------|---------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | Trial Adaptor | M | L | XL | M | L | XL | M | L | XL | M | L | XL | M | L | XL |
| Implants | Shell | 42 | 42 | 42 | 45 | 45 | 45 | 48 | 48 | 48 | 51 | 51 | 51 | 53 | 53 | 53 |
| | Insert | 42 | 42 | 42 | 42 | 42 | 42 | 46 | 46 | 46 | 50 | 50 | 50 | 50 | 50 | 50 |
| | Head | M | L | XL | M | L | XL | M | L | XL | M | L | XL | M | L | XL |

From Anatomical Shoulder Fracture to Anatomical Shoulder Bipolar

Removal of the Anatomical Shoulder Fracture Implant Head

With a cemented Humeral Stem, use a Lexer Chisel to free the Humeral Head of cement so that the extraction instrument can be applied.

The extraction instrument is now applied to the *Anatomical Shoulder Fracture* humeral head and fixed with a two-edged screw. With the aid of the impactor instrument and the slide hammer weight the humeral head is separated from the *Anatomical Shoulder Fracture* humeral stem (Fig. 34).



Anatomical Shoulder Fracture

Removal of the Anatomical Shoulder Fracture Base Plate

Once the Humeral Head has been removed the Locking Screw in the Base Plate has to be removed by the Hexagonal Wrench 4.5mm (Fig. 35).

Note

Do not use the Torque Wrench.
In order to generate the necessary holding force against the torque the Base Plate must be hold by the Forceps.

The Holding Forceps has exactly the contour of the Base Plate and allows a tight contact during the removing procedure (Fig. 35). If necessary use any adequate Chisel in order to fully release the Base Plate.

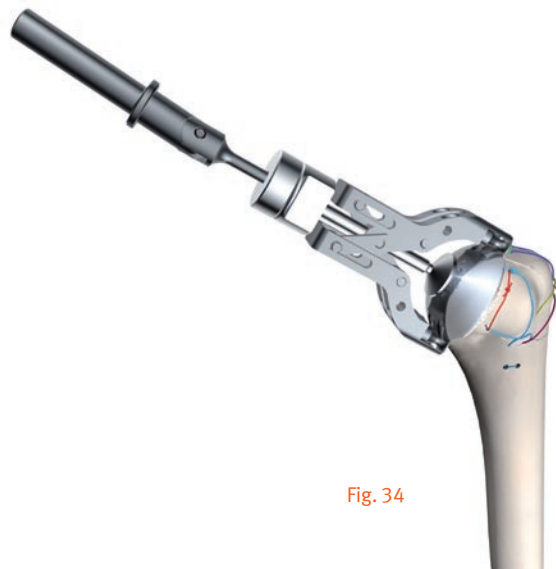


Fig. 34

Procedure to define a head size and neck length by trial inserts

Follow instructions page 12–13.



Fig. 35

The prosthesis is then reduced and stability is checked (Fig. 36).

Postoperative Treatment

It is the responsibility of the doctor to decide which postoperative treatment is appropriate depending on each patient's health condition.



Fig. 36

Bipolar Head Disassembly Method

In case of revision surgery, a release ring unlocks the cup and liner (Fig. 37). Ensure that any connecting tissue is removed from the polyethylene insert. Using the release ring, the metal locking ring can be squeezed, thus unlock the mechanism and separate the components without damaging them. Push the protruding tabs of the release ring completely into the corresponding flutes in the outer shell and withdraw the shell from the PE insert.



Fig. 37

Note

The release ring is only to be used to separate the outer shell from the insert. It must never be left in situ.

Disclaimer

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Lit. No. 06.01664.012 – Ed. 10/2010 ZHUB

