



*UniSyn*<sup>™</sup> Hip System  
*Surgical Technique*



**Reliable Innovation**

# UniSyn™ Hip System

## *Surgical Technique*

as described by Pioneering Surgeon Charles E. Bryant, M.D., Oklahoma City, OK.

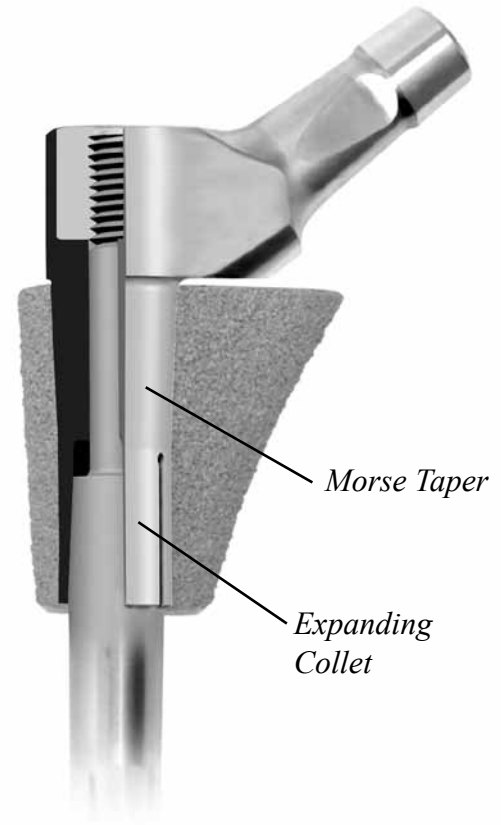
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# Introduction

The UniSyn Hip System is designed with flexibility in mind. The complete interchangeability of components allows for independent adjustment of each anatomic variable. It also simplifies surgery by providing more surgical options and a logical, stepwise technique.

At the core of the UniSyn System is its patented connection technology. The technology combines two established connections, a Morse Taper and an Expanding Collet. These two connections act in concert to stabilize the neck against applied loads and are the key to providing a wide range of component sizes with a single connection geometry.



**Sixteen** different *Neck* sizes for unmatched restoration of *leg length*, *lateral offset*, and *anteversion*. Four vertical lengths with four lateral options for each, covering primary hips to calcar revision cases.

**Twenty One** different *Proximal Bodies*. Titanium plasma sprayed Bodies have six different cone diameters with multiple medial projections for each size. Double tapering medial projections with a natural medial arc provide better proximal fit than conventional modular bodies.

**Stems** in each millimeter diameter from **10 to 20mm**.

**Straight Stem** lengths from **130 to 210mm**.

**Bowed Stem** lengths in **210, 260, and 310mm**.

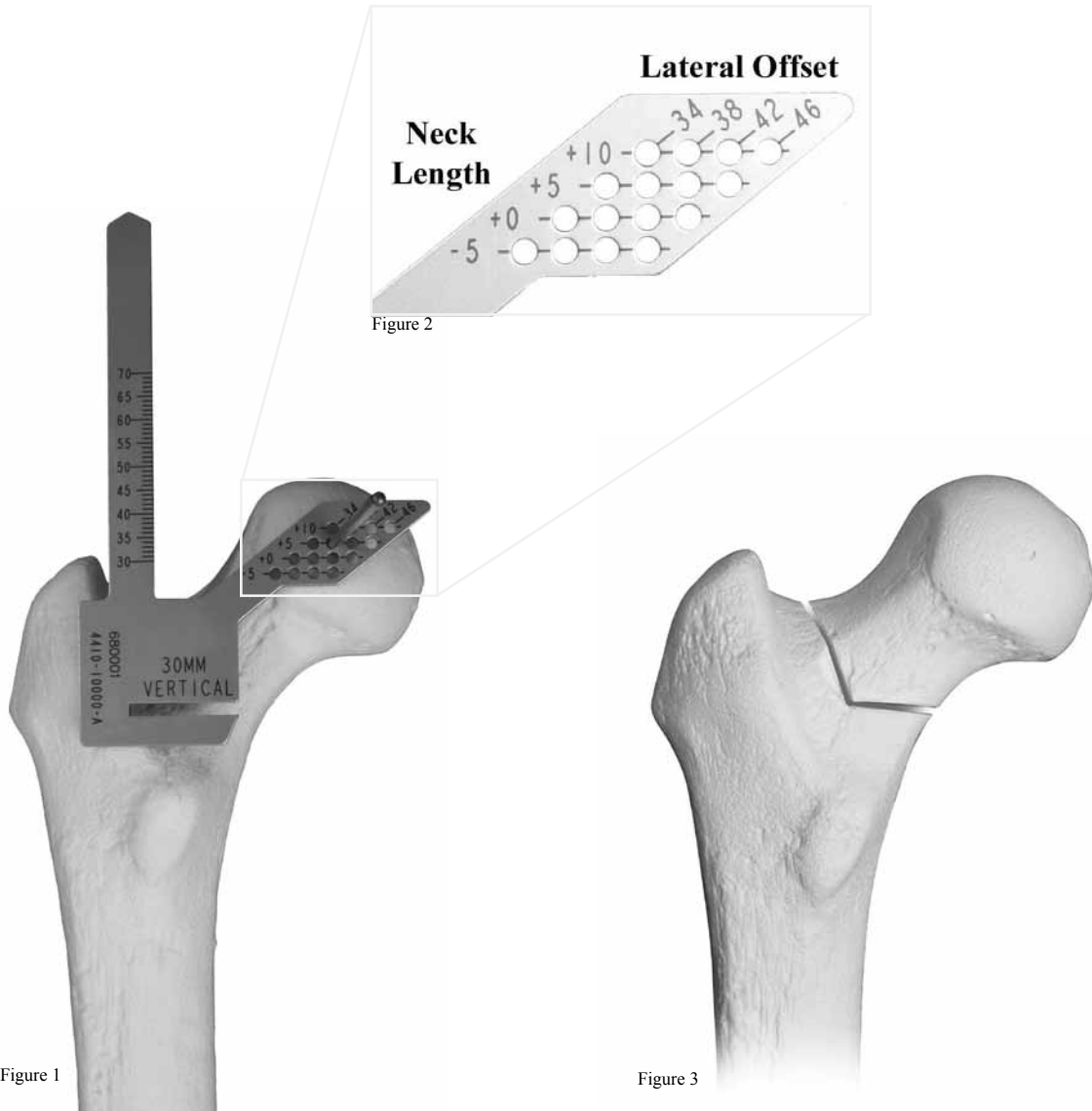
Custom Stems available upon request.

## NOTE:

Please read the UniSyn™ Hip System Instructions for Use (IFU) accompanying UniSyn™ products prior to implanting this device in a clinical setting.

# Neck Resection

Resection level is determined by properly aligning the *Neck Resection Guide* and fixing it with the *Pin* at the femoral head center.



The first cut is made perpendicular to the axis of the femur, laterally towards the intertrochanteric line. The second cut is then made parallel to the intertrochanteric line proximally to the top of the femoral neck. Care should be taken not to extend the cuts past each other as the notch may create a stress riser. A rongeur may be used to radius the corner if a notch is formed.

# ***Femoral Canal Preparation***

## **Exposing the Femoral Canal**

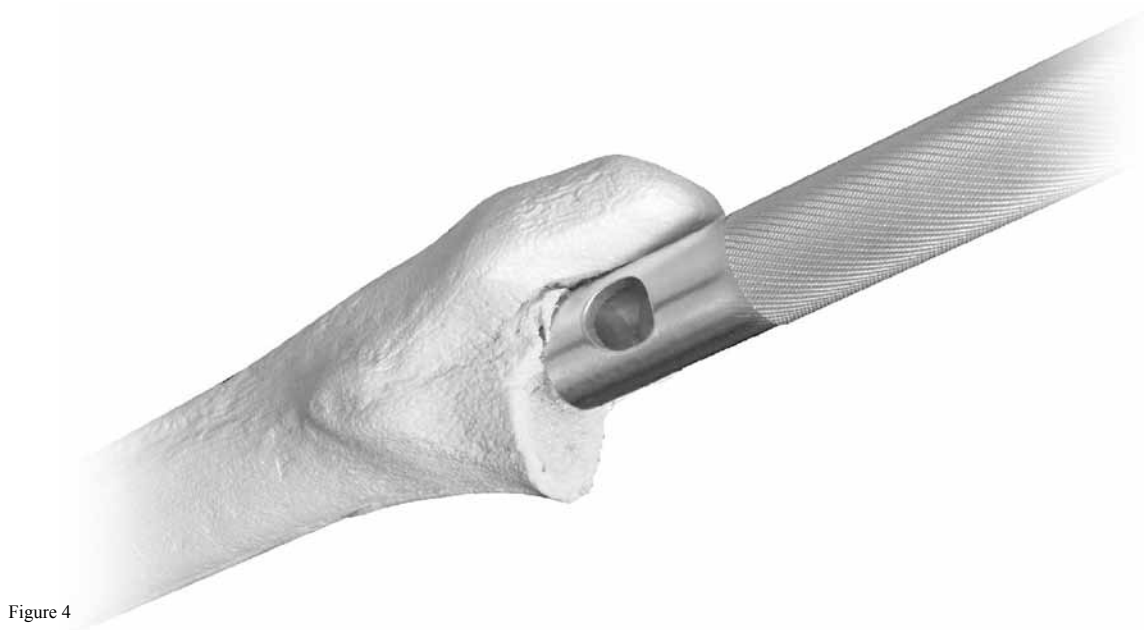


Figure 4

The medial aspect of the greater trochanter is removed with the *Circular Osteotome*.

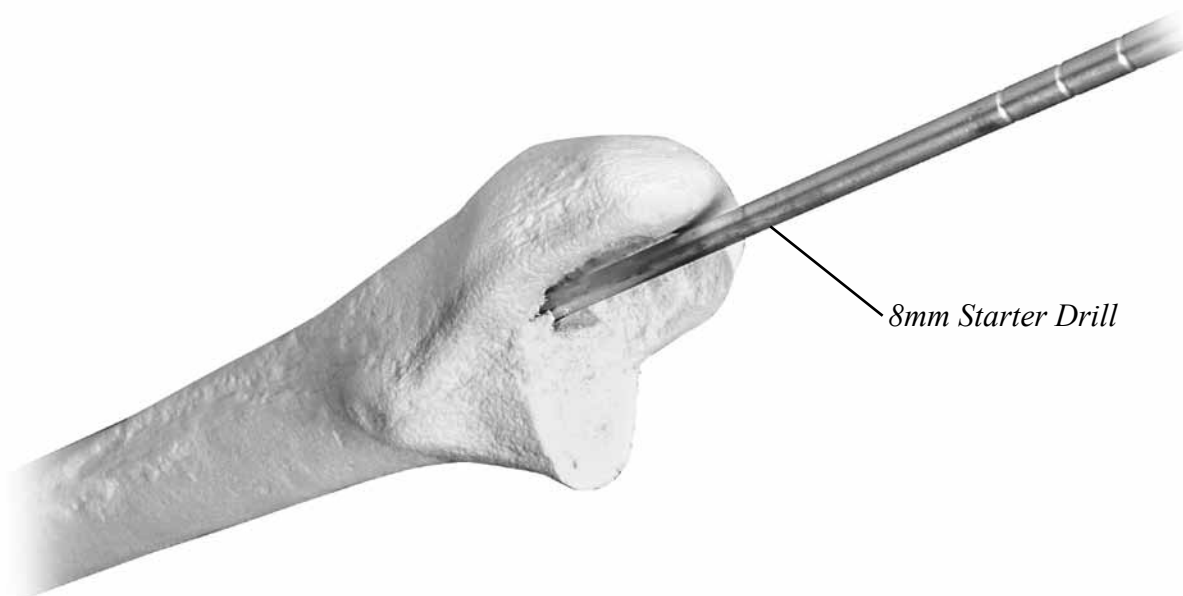


Figure 5

The intramedullary canal is entered with the *Starter Drill* using the *T-handle*.

# Femoral Canal Preparation

## Distal Reaming



Figure 6

Wide grooves

**NOTE:**

To avoid varus positioning of the Implant, it is important to push the Straight Reamer laterally into the greater trochanter.



Figure 7

Stay Lateral Proximally

The distal canal is sequentially reamed until uniform cortical contact is established.

Each **Straight Reamer** is marked with two wide grooves. The first wide groove indicates the appropriate depth for the standard length stem of that diameter. The second wide groove indicates the appropriate depth for the extended length stem of that diameter. Advance the reamer until the appropriate wide groove is even with the resection level.

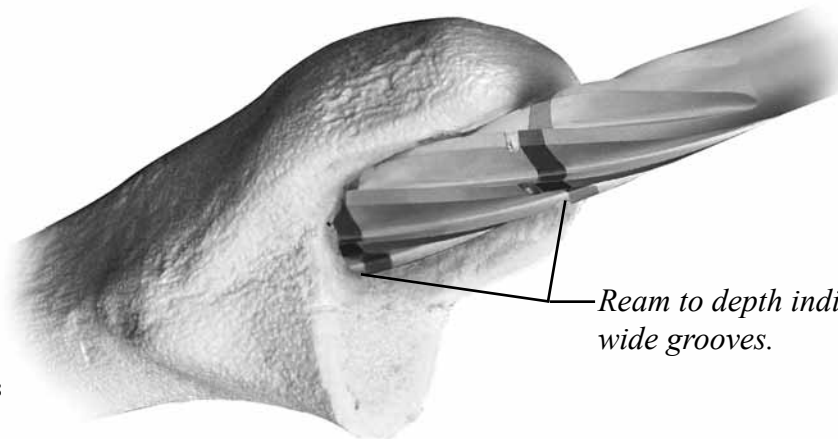


Figure 8

Ream to depth indicated by wide grooves.

Implants are available in 1mm increments from 10mm to 20mm in diameter. See Fig. 9 for length options.

Standard Stem Dimensions		Stem Diameters (mm)											
		10	11	12	13	14	15	16	17	18	19	20	
Stem Lengths (mm)	Straight	130	10 x 130	11 x 130	12 x 130								
		140				13 x 140	14 x 140						
		150						15 x 150	16 x 150				
		160								17 x 160	18 x 160		
		170	10 x 170	11 x 170	12 x 170							19 x 170	20 x 170
		180				13 x 180	14 x 180						
		190						15 x 190	16 x 190				
		200								17 x 200	18 x 200		
	210										19 x 210	20 x 210	
	Bowed	210			12 x 210	13 x 210	14 x 210	15 x 210	16 x 210	17 x 210	18 x 210	19 x 210	20 x 210
260				12 x 260	13 x 260	14 x 260	15 x 260	16 x 260	17 x 260	18 x 260	19 x 260	20 x 260	
310				12 x 310	13 x 310	14 x 310	15 x 310	16 x 310	17 x 310	18 x 310	19 x 310	20 x 310	

Figure 9

# ***Proximal Cone Preparation***

## **18mm Cone Reaming**



Figure 10

The ***18mm Cone Reamer*** may be used as an option to initially open the proximal femoral metaphysis. Insert it until the groove is at the resection level.

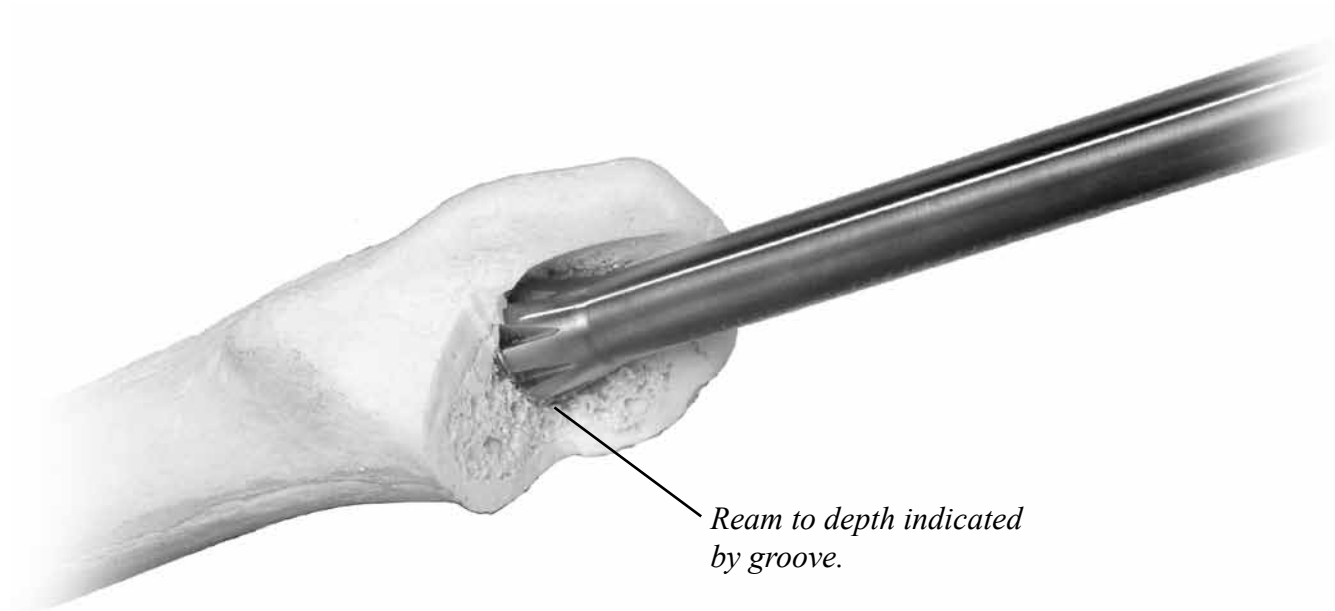


Figure 11

# Proximal Cone Preparation

## Cone Reamer Assembly

Select the *Distal Pilot* corresponding to the diameter of the final Straight Reamer used.



Figure 12

Retract the sleeve on the *Cone Reamer* and insert the *Distal Pilot*.



Figure 13

After allowing the outer sleeve of the *Cone Reamer* to spring back, turning the *Distal Pilot* 1/4 of a turn in either direction will lock the Distal Pilot in the Cone Reamer.

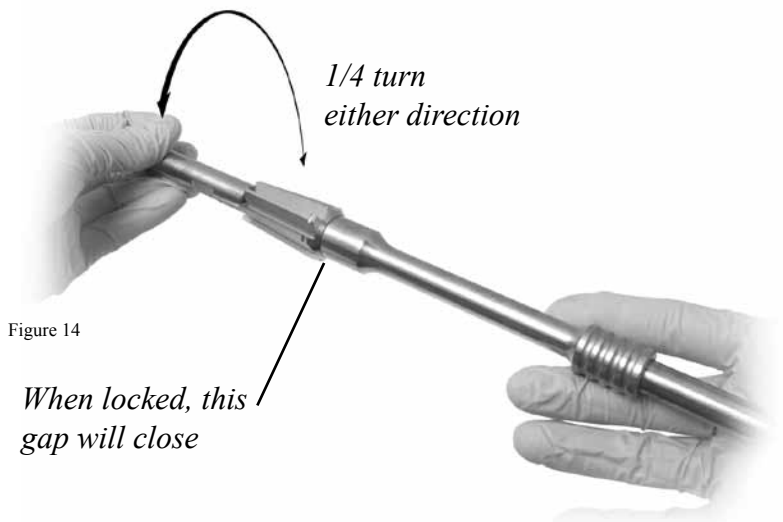


Figure 14

# Proximal Cone Preparation

## Cone Reaming

*Cone Reamer* sizes are 20mm, 22mm, 24mm, 26mm, 28mm, 30mm, and 32mm\*. This references the diameter at the proximal end of the cone reamer. Available Proximal Bodies are listed below.

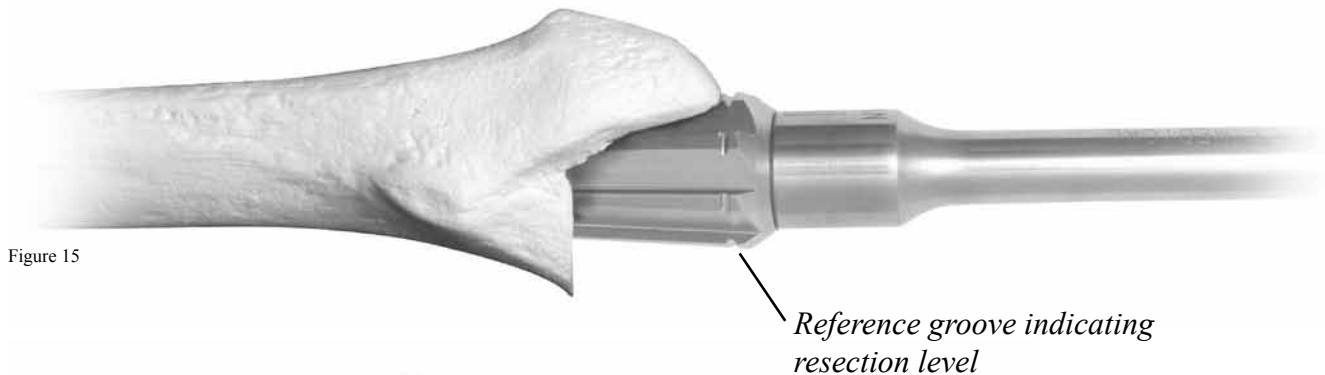


Figure 15

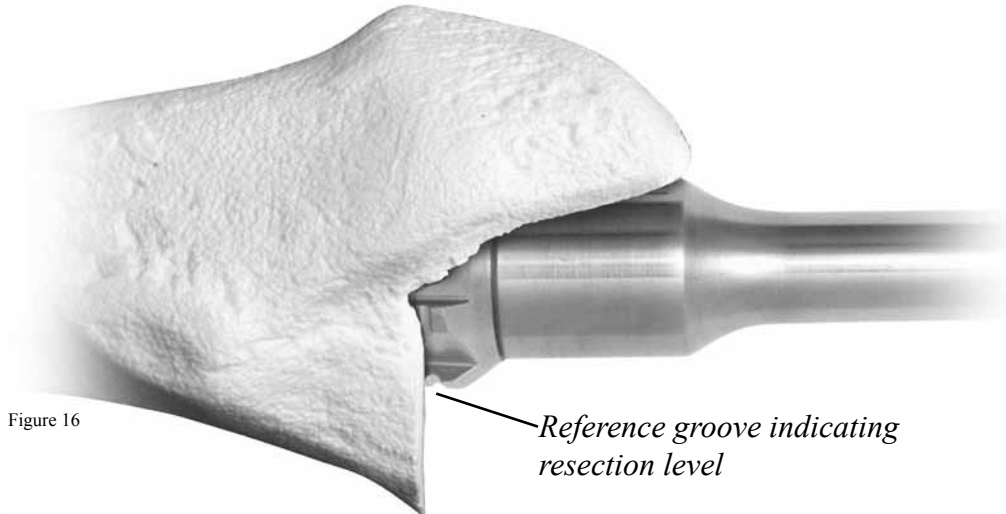


Figure 16

The *Cone Reamer* should be inserted until the groove in the reamer is at the resection level. This level corresponds with the top of the Implant Proximal Body.

The cone diameter should be increased until contact is established with both the anterior and posterior endosteal walls.

Available Proximal Bodies			Medial Projection (mm)				
Cone Diameter (mm)	Superior	Inferior	22	26	30	34	38
	<b>32*</b>	26			32 x 30*	32 x 34*	32 x 38*
	<b>30</b>	24		30 x 26*	30 x 30	30 x 34	30 x 38
	<b>28</b>	22		28 x 26	28 x 30	28 x 34	
	<b>26</b>	21	26 x 22	26 x 26	26 x 30	26 x 34	
	<b>24</b>	19	24 x 22	24 x 26	24 x 30	24 x 34	
	<b>22</b>	18	22 x 22	22 x 26	22 x 30		

Figure 17

\* Available by special order

# Medial Preparation - Broaching Method

## Assembly

The same diameter *Distal Pilot* used for cone reaming is used for medial broaching. The cone diameter of the *Medial Broach* should correspond to the final Cone Reamer used. It is recommended to begin with the Broach that has the smallest medial projection for a given cone diameter.

The *Distal Pilot* is inserted into the *Medial Broach* until it clicks into place.

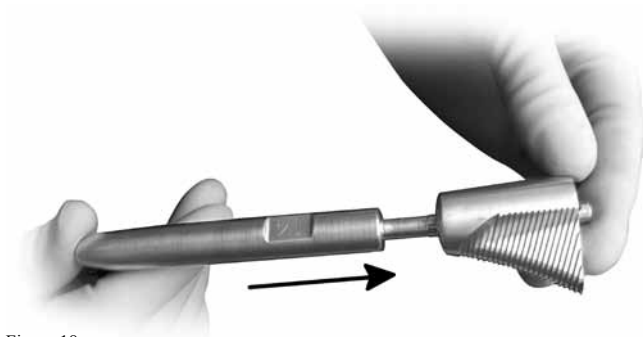


Figure 18



Figure 19

The *Distal Pilot* and *Medial Broach* are then attached to the *Broach Handle*.

Using the Trigger on the *Broach Handle*, the Locking Pin is retracted. When the *Medial Broach* is fully inserted onto the Broach Handle, the Trigger is released locking the Broach and the *Distal Pilot* to the Broach Handle.

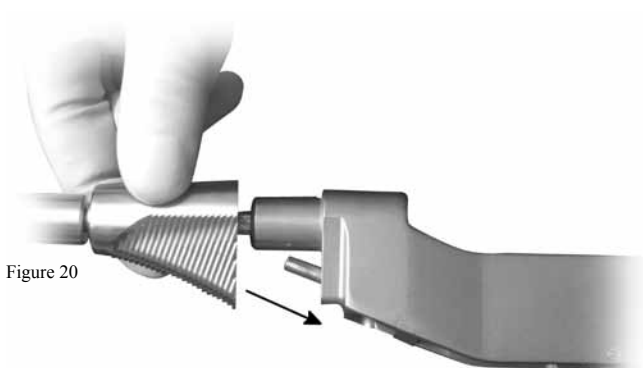


Figure 20

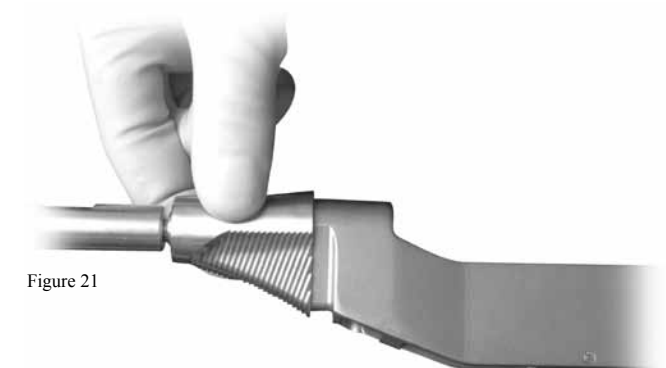


Figure 21

# Medial Preparation - Broaching Method

## Broaching



Figure 22

The **Medial Broach** is introduced into the femur.



Figure 23

The Broach only has teeth on the medial side. The smooth anterior, posterior and lateral surfaces fit into the cavity created by the Cone Reamer.

**NOTE:**

*Bone has been removed by the cone reamer. Although the broach is relieved in this area, the conical portion of the implant will fill the gap.*



Figure 24

Once the Medial Broach with the smaller medial projection has been fully inserted to the resection level...

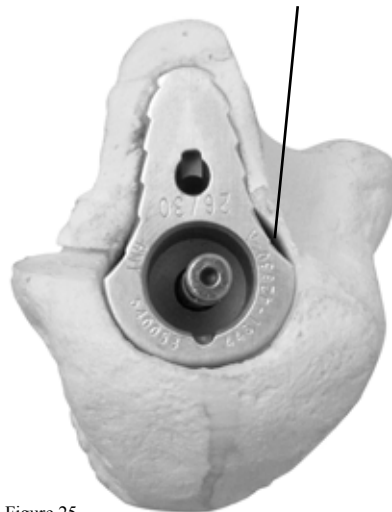


Figure 25

... the next larger Broach is inserted to optimize fit in the medial endosteum.

Once broaching is completed, leave the final Broach in place. This will serve as a platform for establishing the size and position of the Neck component. Continue on to page 15.

# Setting Version

## Neck Connector Assembly



Figure 26



Figure 27



Figure 28

Insert the *Version Adjustment Tool* into the top of the *Neck Positioner*. Make sure to align the tab on the Adjustment Tool with the notch on the Positioner as shown in Fig. 27.

Insert the *Neck Positioner* into the *Medial Broach* and align the tab on the lower portion of the Positioner with the slot in the lateral side of the broach hole as shown in Fig. 28.



Figure 29

Be sure to fully seat the *Neck Positioner*.

# Setting Version

## Adjustment

Adjust the version of the *Neck Positioner* by pushing down on the *Version Adjustment Tool* and rotating it.

Insert the *Version Rod* into the side of the knob on the *Version Adjustment Tool*.

It may be useful to set the *Version Rod* parallel with the tibia and note the version of the proximal femur as indicated by the *Medial Broach* (Fig. 30). Set the desired amount of anteversion by rotating the Positioner toward the operative side marking (Left or Right.)

The *Version Rod* can then be set to indicate the total amount of version desired.

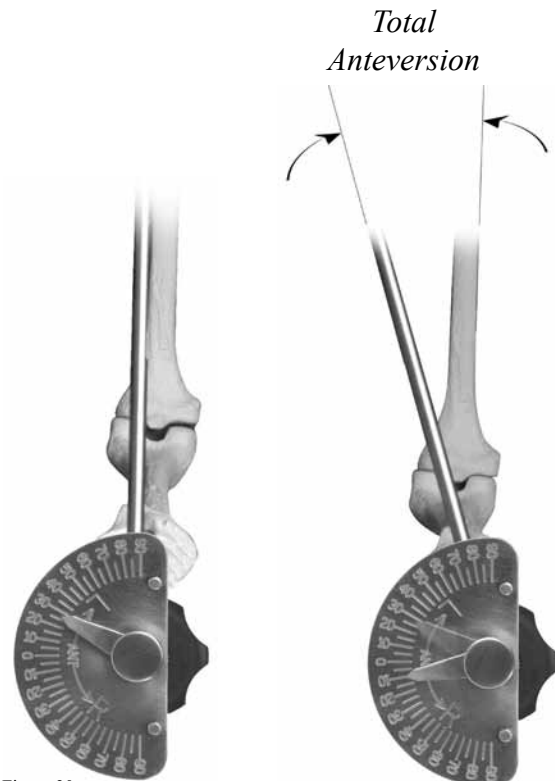


Figure 30

Figure 31

If the *Neck Positioner* does not return to the locked position, slightly turn the *Version Adjustment Tool* and the Positioner will snap into place. Note the orientation as it will be needed later in the Neck/Body assembly step.



Figure 32



Figure 33

### NOTE:

*The version indicator scale references the version between the Neck Positioner and the Medial Broach, not the version between the posterior femoral condyles and the Neck Positioner.*

# Neck Selection

During *Neck Trial* selection, the lateral offset, vertical length, and anteversion can be adjusted independently. To adjust the offset and/or length, a set of 16 different Trials is provided. Standard sizes can be found in Fig. 34 below.

Neck Options		Offset*			
		34mm	38mm	42mm	46mm
Length*	30mm	30 x 34	30 x 38	30 x 42	30 x 46
	36mm	36 x 34	36 x 38	36 x 42	36 x 46
	45mm	45 x 34	45 x 38	45 x 42	45 x 46
	55mm	55 x 34	55 x 38	55 x 42	55 x 46

Figure 34

\* *Offset = distance from the stem center line to center of +0 head.*

\* *Length = distance from the top of the proximal body to center of +0 head.*



Figure 35

34mm offset



Figure 36

38mm offset



Figure 37

42mm offset



Figure 38

46mm offset

# Implant Assembly



Figure 39

Loosely assemble the *Neck/Body Implants* and clip the *Version Guide* around the base of the neck.



Figure 40

Set the version on the bottom of the *Version Guide* to duplicate that of the Version Adjustment Tool. Use the peak of the medial spout to align with the desired marking. A slight squeeze of the Body against the Neck will set them in place.

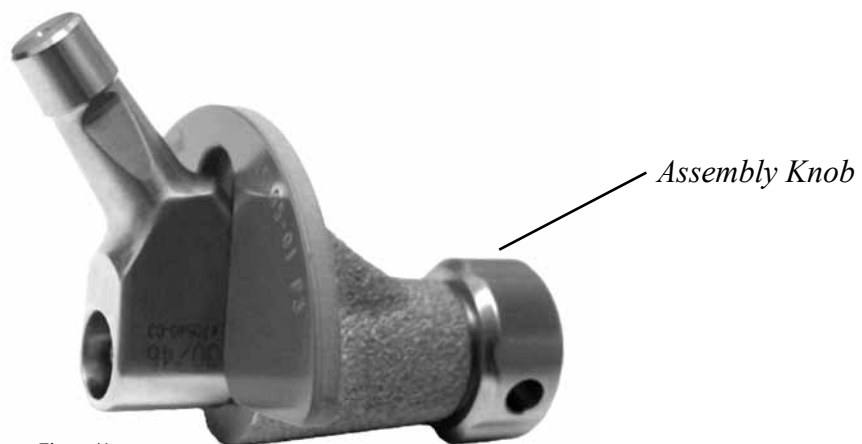


Figure 41

Insert the *Assembly Knob* through the *Neck/Body Implants* (Fig. 41).

# Implant Assembly

## Neck/Body

With the handle fully open, insert the *Implant Assembly Tool* into the countersink of the *Neck Implant*. Completely screw the *Assembly Knob* into the Assembly Tool.



Figure 42

Push the outer button down to reset the calibrated compression indicator (Fig. 43).

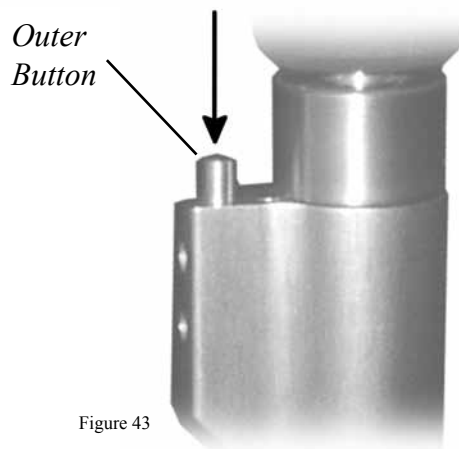


Figure 43

Close the handles of the *Implant Assembly Tool* until the indicator button pops up.

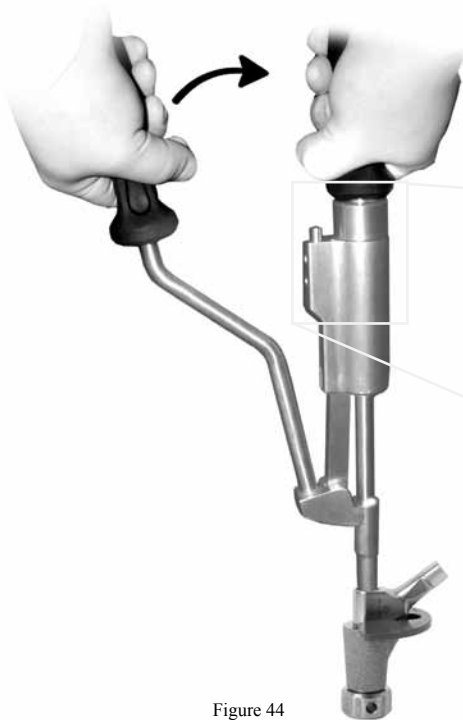


Figure 44



Figure 45

**NOTE:**  
*This indicates a force of 1500 lbs has been applied to lock the Neck/Body Taper Connection.*

# Implant Assembly

## Stem

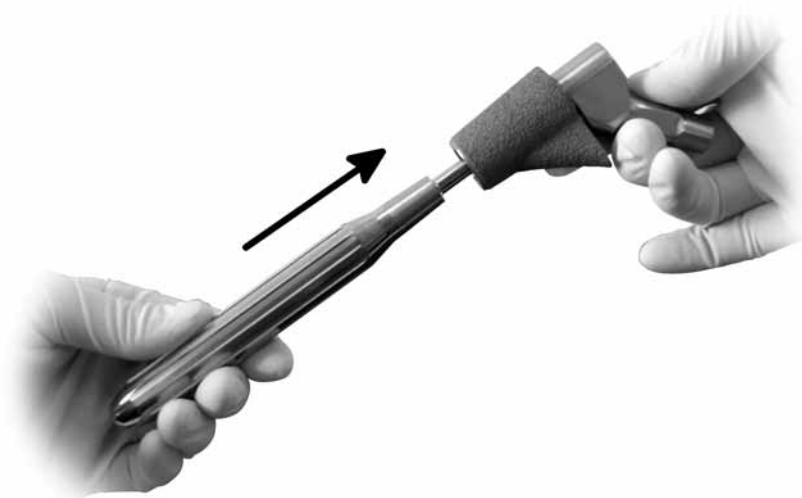


Figure 46



Figure 47

The *Stem Implant* is passed through the *Neck/Body Assembly*.



Figure 48

Thread the *Implant Insertion/Disassembly Driver* onto the *Stem Implant*. This will firmly hold the Stem while allowing the Neck/Body to rotate freely.

# Implant Insertion

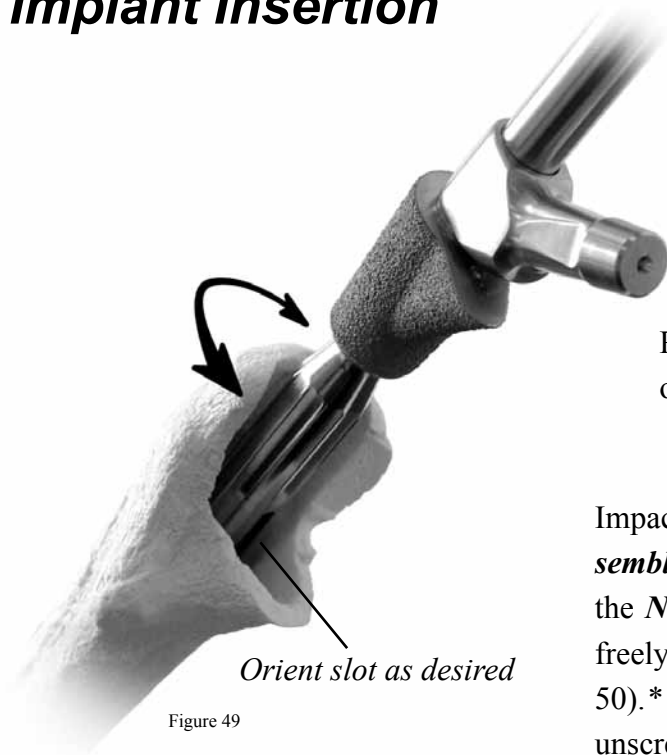


Figure 49

Rotate the **Stem Implant** to position slot in the desired orientation prior to engaging flutes in the distal canal.

Impact the **Stem Implant** with the **Implant Insertion/Disassembly Driver**. The stem will be driven slightly ahead of the **Neck/Body Assembly**, allowing the assembly to rotate freely about the stem and settle in the prepared position (Fig. 50). \* Remove the Implant Insertion/Disassembly Driver by unscrewing it from the threaded stem.



The **Implant Insertion/Disassembly Driver** should be easily removed. However, if it does become jammed, the cap at the end can be loosened, relieving any pressure that might be causing resistance.



\* **NOTE:** The UniSyn™ Hip System was designed for uncemented use, however, if it is necessary to cement a UniSyn™ Hip we recommend the addition of cement to appropriately stabilize the chosen implant.

## Final Assembly

A threaded *Extension* and *Extension Sleeve* are provided to simplify attachment of the *Implant Assembly Tool*.

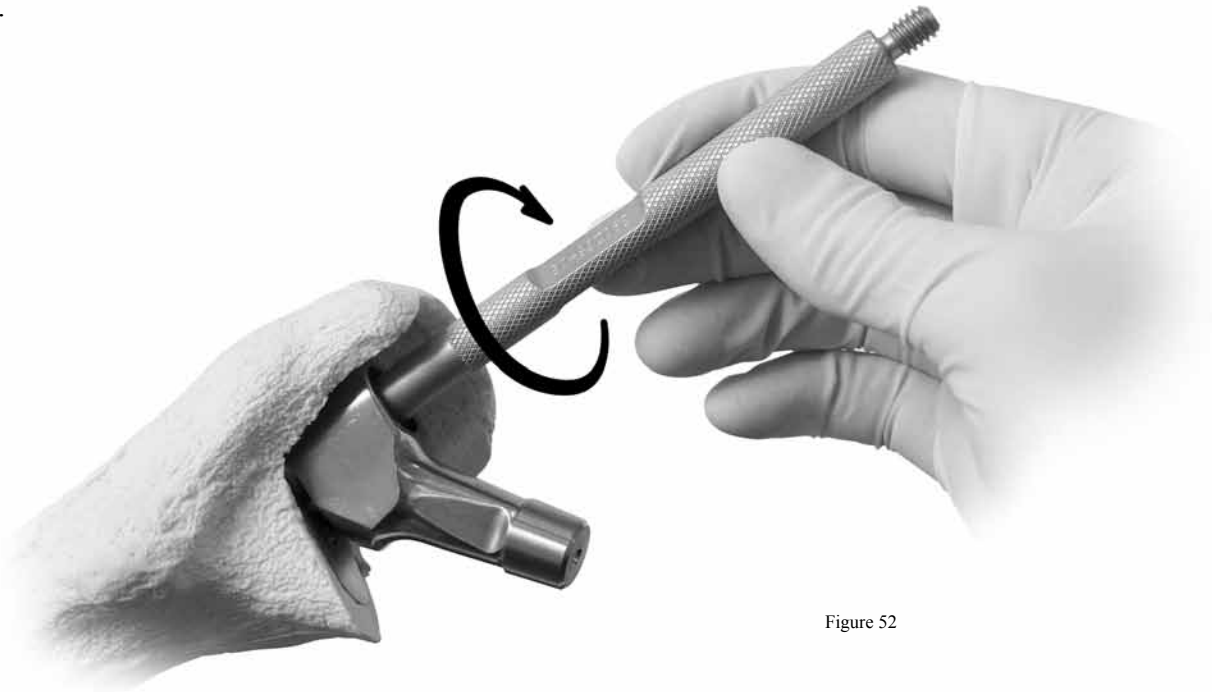


Figure 52

Hand thread the female end of the *Extension* fully onto the exposed threaded end of the *Stem Implant*. This should thread easily by hand.

**CAUTION: Do Not Cross Thread!**

\* If necessary for removal use combo wrench (Figure 62)



Figure 53

Slide the *Extension Sleeve* over the threaded *Extension* with the narrow end fitting into the countersink of the *Neck Implant*.

## Final Assembly

With the handle *open*, thread the *Implant Assembly Tool* onto the threaded *Extension*. Continue threading to fully draw the *Stem Implant* up into the *Neck/Body Assembly*.



Figure 54



Figure 55

Push the outer button down to reset the calibrated compression indicator.

Compress the two handles of the *Implant Assembly Tool* together to engage the taper of the *Stem Implant* with the *Neck/Body Assembly*.

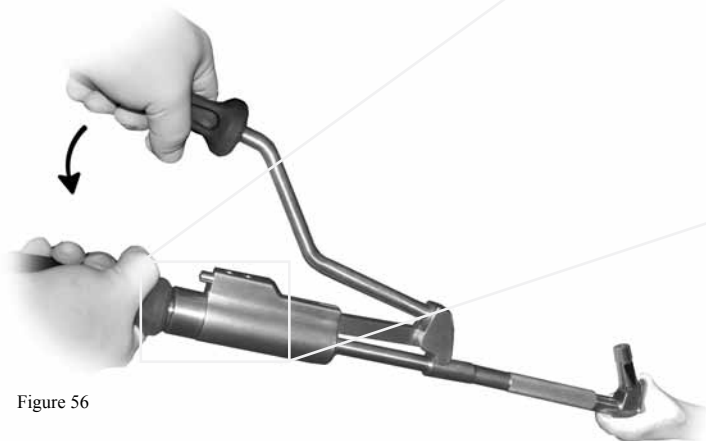


Figure 56

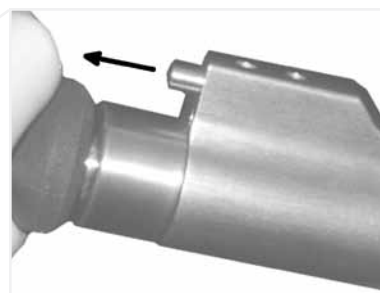


Figure 57

The outer button will pop up when the proper amount of force is applied to fully engage the taper of the *Stem Implant* in the *Neck/Body Assembly*. This also expands the cylindrical collet of the Neck Implant, further securing it within the Body Implant.

# Final Assembly



Figure 58

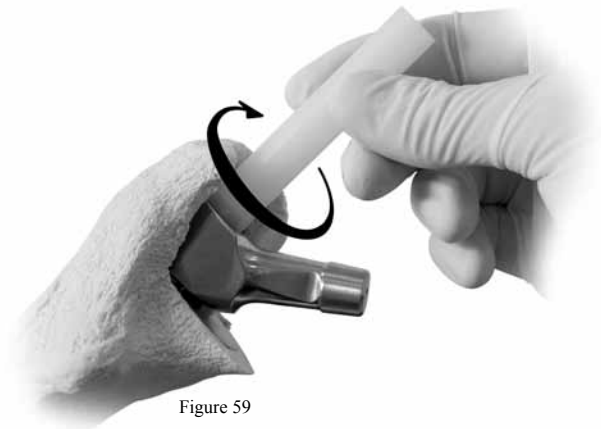


Figure 59

Insert the **Locking Nut** into the **Polyethylene Holder**.

Thread the **Locking Nut** onto the **Stem Implant**.



Figure 60

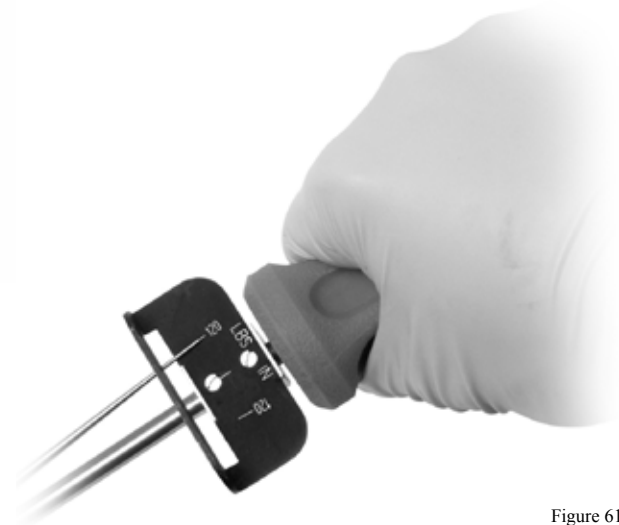


Figure 61

Assemble the **Socket/Neck Stabilizer**, **Stabilizer Handle**, and **Torque Wrench** as shown (Fig. 60). Use the Stabilizer Handle to minimize rotational force on the Neck Implant while turning the Torque Wrench until the pointer reaches the "120" mark (Fig. 61).

# Implant Disassembly/Removal

## Locking Nut Removal

The first step in removing or disassembling the implant is to remove the **Locking Nut**. Use the **Combination Wrench** (Fig. 62) on the **Socket / Neck Stabilizer** to remove the Locking Nut. Use the **Stabilizer Handle** to minimize rotational force on the **Neck Implant** while turning.



Figure 62

## Distal Stem Disengagement

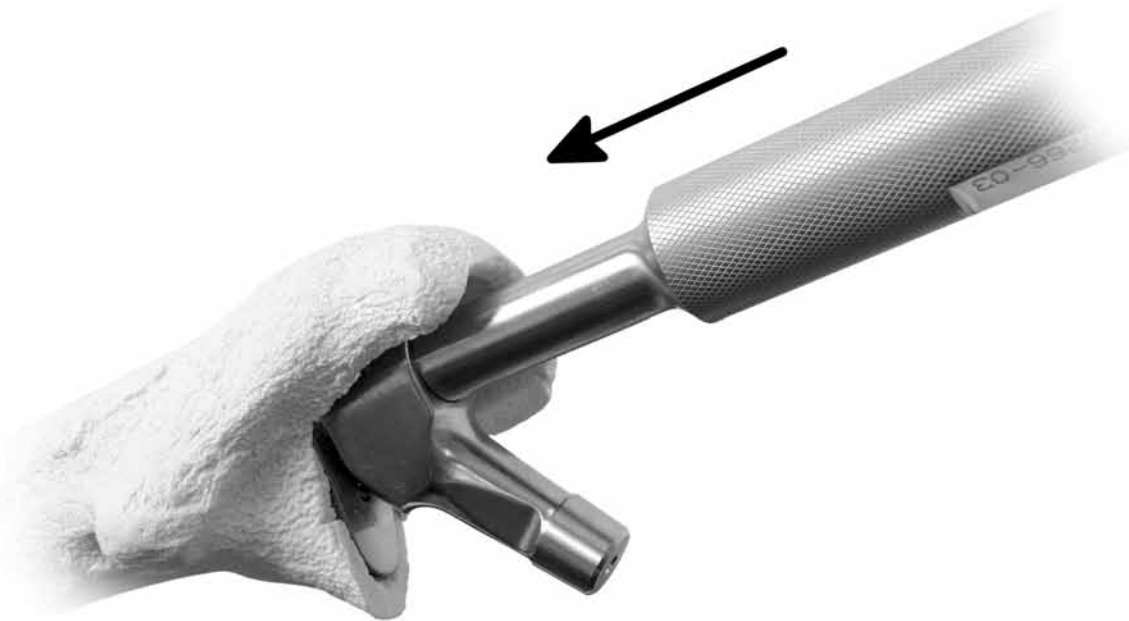


Figure 63

The taper of the **Stem Implant** must be disengaged before the **Neck/Body Implants** can be separated. Thread the **Implant Insertion/Disassembly Driver** onto the Stem Implant and impact to disengage the taper of the Stem Implant from the **Neck/Body Assembly**.

# ***Implant Disassembly/Removal***

## **Body/Neck Disassembly**



Figure 64

Place the ***Disassembly Key*** in the space between the ***Neck*** and ***Body*** Implants. Direct the wedge to avoid impingement on the Neck taper joining the Body Implant. Place a retractor on the opposite side of the neck to protect the soft tissue. *Do not impact the key into the Neck Taper!*

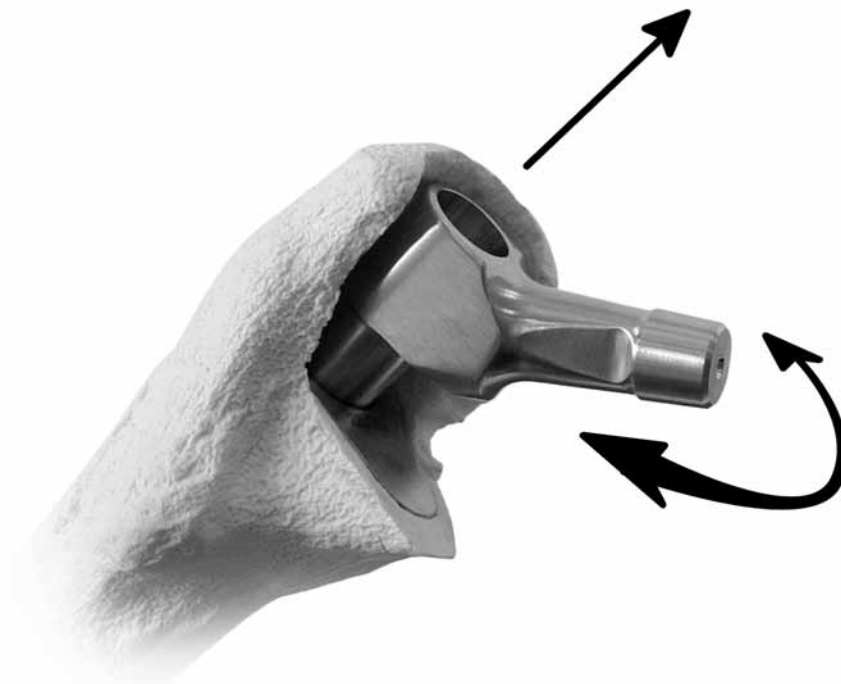


Figure 65

Once the taper is disengaged, the ***Neck Implant*** can be repositioned or removed by hand.

# Implant Disassembly/Removal

## Stem and/or Body Extraction

**NOTE:**

Stems which are 14mm in diameter and larger will not pass through the **Body Implant**.

Fully thread the **Slap Hammer** onto the **Stem Implant**. Distracting the stem will impart a distraction force on the **Body Implant** as well.

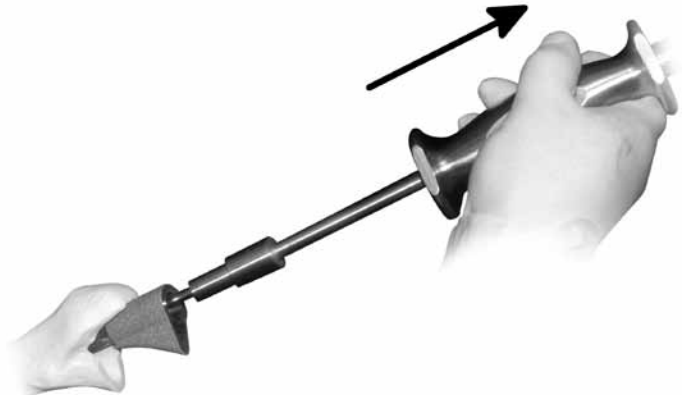


Figure 66

**NOTE:**

Stems which are 13mm in diameter or smaller will pass through the **Body Implant**.

Fully thread the **Slap Hammer** onto the **Stem Implant**. Distracting the Stem will remove the stem through the **Body Implant**.

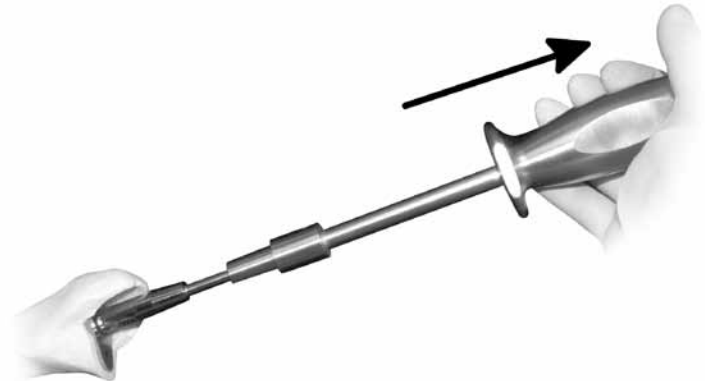


Figure 67

The **Body Extractor** provides a lip which can be inserted through the **Body Implant** and hooked on its distal edge. This can be threaded onto the Slap Hammer and used to remove the Body Implant.

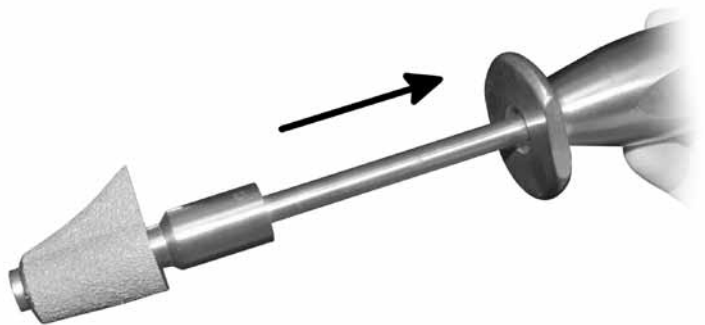


Figure 68



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