Surgical Technique
INDICATIONS
The indications for use of the total hip replacement prostheses include:
• Noninflammatory degenerative joint disease, including osteoarthritis and avascular necrosis;
• Rheumatoid arthritis;
• Correction of functional deformity;
• Revision procedures where other treatments or devices have failed; and,
• Nonunions, femoral neck fractures, and trochanteric fractures of the proximal femur with head involvement that are unmanageable using other techniques.

Additional indication specific to use of ACCOLADE II Femoral Stems with compatible Howmedica Osteonics Constrained Liners:
• When the stem is to be used with compatible Howmedica Osteonics Constrained Liners, the device is intended for use in primary or revision patients at high risk of hip dislocation due to a history of prior dislocation, bone loss, soft tissue laxity, neuromuscular disease, or intra-operative instability.

CONTRAINDICATIONS
• Active infection or suspected latent infection in or about the hip joint;
• Bone stock that is inadequate for support or fixation of the prosthesis;
• Skeletal immaturity;
• Any mental or neuromuscular disorder that would create an unacceptable risk of prosthesis instability, prosthesis fixation failure, or complications in post-operative care; and
• Obesity. An overweight or obese patient can produce loads on the device that can lead to failure of the fixation of the device or to failure of the device itself.

WARNINGS AND PRECAUTIONS
See package insert for warnings, precautions, adverse effects and other essential product information.

Before using ACCOLADE II instrumentation, verify:
• Instruments have been properly disassembled prior to cleaning and sterilization;
• Instruments have been properly assembled post-sterilization;
• Instruments have maintained design integrity; and,
• Proper size configurations are available.

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For cleaning and sterilization instructions of surgical instruments, refer to the instrument package insert.
A proper neck resection level directly affects the final placement and fit of the femoral stem. By using the anatomic landmarks referenced during pre-operative x-ray templating, the pre-planned neck resection is made with an oscillating saw and with the aid of the Neck Resection Guide. The guide helps the surgeon to determine the correct stem orientation and placement. After careful pre-operative templating, the guide is placed on the anterior/posterior aspect of the exposed proximal femur and the planned femoral neck cut is marked using a marking instrument of choice. Care should be taken to align the body of the guide with the axis of the femoral canal (Figure 4).
The ACCOLADE II Hip System is a broach only system. While use of an axial starter reamer is needed, use of cylindrical reamers is not necessary to prepare the femoral canal. The Axial Starter Reamer is used with the T-Handle to open the femoral canal and to aid in determining the orientation of the femoral axis. The tapered design allows for access to the canal and is graduated along the flutes, which helps provide a reference during insertion into the canal. Advance the Axial Starter Reamer into the femoral canal to a depth at which the first graduation mark is aligned with the medial aspect of the neck resection (Figure 6).

Slight lateral pressure on the reamer during operation will aid in preparing the femoral canal in the neutral orientation of the implant.

Care should be taken not to sink the starter reamer below the first graduation mark to allow for proper press fit of the implant.

To help ensure proper final orientation of the stem, lateral bias during implant preparation is preferred. Retraction of the gluteus medius and removal of the lateral cortical bone at the piriformis insertion will permit true axial introduction of the instruments and implant. The Modular Box Osteotome or a rongeur can be used to remove bone from this area (Figure 5).

**Tip**
Art Malkani, M.D.
Remove the lateral cortical bone at the piriformis fossa to obtain ideal proximal fit and to minimize the risk of undersizing and/or varus placement of the femoral component.

**Note**
To help ensure proper final orientation of the stem, lateral bias during implant preparation is preferred. Retraction of the gluteus medius and removal of the lateral cortical bone at the piriformis insertion will permit true axial introduction of the instruments and implant. The Modular Box Osteotome or a rongeur can be used to remove bone from this area (Figure 5).

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**STEP 4**

**BROACHING**

Broaching is then performed beginning with the size 0 broach. The broach should be oriented to the long axis of the oblong shape created by the neck resection (Figure 7).

Sequentially broach upward in size until the proper size is achieved. The surgeon’s clues to a firm fit and final size include 1.) changing pitch of sound that results from mallet blows to the broach handle; 2.) increased resistance to forward advancement; 3.) lack of further motion.

Two grooves on the anterior and posterior surfaces of the broach act as a point of reference to help the surgeon visualize the broach advancing into the femur (Figure 8).

Panel A

**Instruments**

<table>
<thead>
<tr>
<th>Instruments</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offset Broach Handle</td>
<td>1020-1460</td>
</tr>
<tr>
<td>ACCOLADE II Broach</td>
<td>Size 0-11 1020-52xx</td>
</tr>
<tr>
<td>Mallet</td>
<td>1120-1000</td>
</tr>
<tr>
<td>Calcar Planer - Standard</td>
<td>1020-1111</td>
</tr>
</tbody>
</table>

**Note**

ACCOLADE II broaches can be properly identified in several ways.
1) The broach size is engraved into a square pocket on both the anterior and posterior sides of the broach.
2) The size is marked on the top of the broach post.
3) The distal lateral tip of the broach is polished.
4) 1020-52xx part number

**Tip**

Frank Kolisek, M.D.

If the broach and/or stem stops above or below the original neck resection, leg length and soft-tissue tensioning must be re-assessed during intra-operative trialing. Do not force the broach and/or stem to the resection level. This will increase the risk of proximal femur fracture.

Generally, if a broach sinks below the level of the neck resection, advance to the next larger broach. If the neck resection is deemed higher than desired, remove the broach and perform a new neck resection at a lower level.

Relying only on the neck resection height alone for final seating height may lead to improper sizing and inadequate component fixation.

The final broach should seat firmly against medial and lateral cortical bone (Figure 9).

Relating to the neck resection height alone for final seating height may lead to improper sizing and inadequate component fixation.

The final broach should seat firmly against medial and lateral cortical bone (Figure 9).

For good fixation of the implant, it is important that axial alignment of the broach is maintained at all times in the canal. Generally, the broach rotation is self-aligning.

Upon reaching the final size and depth of the broach, detach the broach handle from the broach, leaving the broach fully seated in the femoral canal.

**OPtIOnAL StEPl**

Assemble the Calcar Planer to the reamer power adaptor. Guide the Calcar Planer over the broach post ensuring the Calcar Planer is axially aligned with the post and is stable. Initiate power prior to contacting the femur and slowly advance the Calcar Planer toward the broach using continuous power until the positive stop on the Calcar Planer contacts the broach face and the bone is removed (Figure 10A). Failure to operate the Calcar Planer in accordance with these instructions may result in damage to the femur.

In the event that the Calcar Planer cannot fully engage the broach post (Figure 10B), remove the broach and perform a new neck resection at a lower level. Alternatively, a larger broach size should also be considered.

Tip

Frank Kolisek, M.D.

Pre-operative templating serves as a guide. Don’t keep hitting the broach harder just because you have not reached the size that was templated.

**Figure 10A**

**Figure 10B**
STEP 5
TRIAL REDUCTION

Select a Neck Trial which has the same base neck length and angle as the planned implant size. This can be determined in two ways.

1. Match the color indicator located on top of the Neck Trial taper to the color indicator on top of the broach (Figure 11).

2. The table below indicates the correct neck length for each size stem and the corresponding color code. The size of the broach directly corresponds to the size of the implant.

<table>
<thead>
<tr>
<th>STEM SIZE</th>
<th>NECK TRIAL LENGTH/COLOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>0, 1</td>
<td>27mm/Yellow</td>
</tr>
<tr>
<td>2, 3</td>
<td>30mm/Blue</td>
</tr>
<tr>
<td>4, 5, 6</td>
<td>35mm/Green</td>
</tr>
<tr>
<td>7, 8, 9</td>
<td>37mm/Black</td>
</tr>
<tr>
<td>10, 11</td>
<td>40mm/Red</td>
</tr>
</tbody>
</table>

Assemble the Neck Trial onto the broach. Next, assemble a V40 Head Trial onto the Neck Trial (Figure 12). Femoral heads come in multiple offsets and are different for each femoral head implant material (see table at right.) For this reason, final head material should be chosen prior to trial reduction. Offsets add or subtract from the base neck length of the implant and help to achieve the desired leg length and offset.

Perform a trial reduction of the hip. Upon confirmation of the selected components, remove the trial head and trial neck, and reassemble the broach handle to the broach. Remove the broach from the femoral canal. The final broach size determines the correct implant size.

### HEAD OFFSETS

<table>
<thead>
<tr>
<th>HEAD</th>
<th>HEAD SIZE</th>
<th>HEAD OFFSETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoCr V40</td>
<td>22</td>
<td>+10, +3, +6</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>+3, +6, +8, +12</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>+4, +6, +8, +12</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>+4, +6, +8, +12</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>+5, +7, +10</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>+4, +6, +8, +12</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>+4, +6, +8, +12</td>
</tr>
<tr>
<td>Alumina V40</td>
<td>28</td>
<td>-2.7, +0, +4</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>-2.5, +0, +5</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>-5, +0, +5</td>
</tr>
<tr>
<td>Alumina C-Taper</td>
<td>28</td>
<td>-2.5, +0, +5</td>
</tr>
<tr>
<td>(when used with C-Taper Adaptor Sleeve/catalog #17-0000E)</td>
<td>32</td>
<td>-2.5, +0, +5</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>-5, +0, +5</td>
</tr>
<tr>
<td>delta BIOLOX V40</td>
<td>28</td>
<td>-4, -2.7, +0, +4</td>
</tr>
<tr>
<td></td>
<td>32</td>
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<td></td>
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<td>-5, -2.5, +0, +2.5, +5, +7.5</td>
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<td>delta BIOLOX C-Taper</td>
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<tr>
<td>(when used with C-Taper Sleeve - catalog #17-0000E)</td>
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<td>-2.5, +0, +2.5, +5</td>
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<td></td>
<td>36</td>
<td>-5, -2.5, +0, +2.5, +5, +7.5</td>
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<tr>
<td>delta BIOLOX Universal Taper</td>
<td>28</td>
<td>-2.5, +0, +4</td>
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<tr>
<td>(when used with Universal Taper Sleeve - catalog #6519-T-XXX)</td>
<td>32</td>
<td>-2.5, +0, +4</td>
</tr>
<tr>
<td></td>
<td>36</td>
<td>-2.5, +0, +4</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>-2.5, +0, +4</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>-2.5, +0, +4</td>
</tr>
</tbody>
</table>

### Note

Head Trials with an “r” suffix are made from a radiopaque material, making them visible on an x-ray.
STEP 6

IMPLANTING THE STEM

OPTION 1
Thread the Modular Threaded Stem Inserter into the drive hole on the proximal face of the stem (Figure 13). The inserter should be fully threaded and secured to the stem prior to impaction to prevent damage to the threads on the implant or the instrument. Using the inserter, the stem should be inserted into the femoral canal until it stops.

Tip
Dermot Collopy, M.D.
If the stem hangs up due to impingement of the Modular Threaded Stem Inserter against the overhanging tip of the greater trochanter, remove the threaded stem inserter leaving the stem in place and use the Modular Stem Impactor to fully seat the stem.

Figure 13

OPTION 2
The ACCOLADE II Femoral Stem can also be inserted using the Modular Offset Quick Connect Stem Inserter. Place tip of the inserter into the drive hole of the stem taking care to align the version tab on the inserter with the slot in the stem (Figure 14). The quick connect design provides the inserter with a stable spring connection, but it does not provide a mechanical lock. Therefore, this assembly should be handled with care, as excessive shaking or motion may result in the stem disassociating from the inserter.

Note: The Modular Offset Quick Connect Stem Inserter cannot be used with the Size 0 and Size 1 ACCOLADE II. Misuse could lead to instrument failure.

Figure 14

OPTION 3
The ACCOLADE II Femoral Stem can also be inserted by hand and then impacted into the bone using the Modular Stem Impactor. The Modular Stem Impactor has a spherical tip, which is placed onto the drive hole of the stem. This instrument allows for off-axis impaction of the stem. The Modular Stem Impactor does not connect to the stem, and, therefore, can only be used for final impaction of the stem.

A Mallet is then used to seat the stem into the canal (Figure 15). The surgeon should NOT attempt to continue impacting the femoral component if visual and auditory clues indicate that the stem is firmly seated in the canal. These clues, rather than the broach seating level, should be used to determine the final seating height of the implant. Continued aggressive impaction could lead to femoral fracture. In the event that dense bone is encountered intra-operatively and compounding anatomical factors are present, the seating of the implant may not be consistent with the level of the broach due to the viscoelastic nature of the femoral bone. If the final seating height is undesirable, the implant can be removed and additional broaching can be performed. If the stem inserter is contacting the greater trochanter during insertion, continued impaction could lead to a fracture.

Figure 15

Tip
Frank Koltesek, M.D.
Prior to any impaction using the Mallet, the implant should always be inserted into the femoral canal until it stops. This aids in positioning the implant in the same orientation that was broached, preventing the stem from being forced into a different position.

Instruments
- Modular Threaded Stem Inserter 1020-1800
- Modular Offset Quick Connect Stem Inserter 1020-1880
- Modular Stem Impactor 1020-1870
- Orthonomic Modular Handle 1020-2900
- Mallet 1120-1000

When selecting a BIOLOX delta Universal Taper Ceramic Femoral Head (6519-1-0xx) for implantation, use of a Universal Adaptor Sleeve is necessary.

<table>
<thead>
<tr>
<th>Catalog No.</th>
<th>Offset (mm)</th>
<th>Taper</th>
</tr>
</thead>
<tbody>
<tr>
<td>6519-T-025</td>
<td>-2.5</td>
<td>V40</td>
</tr>
<tr>
<td>6519-T-100</td>
<td>+0</td>
<td>V40</td>
</tr>
<tr>
<td>6519-T-204</td>
<td>+4</td>
<td>V40</td>
</tr>
</tbody>
</table>

After completing the trialing process, intra-operatively assemble the adaptor sleeve to the femoral stem manually. The Universal Adaptor Sleeve must be fully seated on the stem taper before the head is assembled.

Prior to final head assembly, neck length / head offset selection may be re-evaluated using a V40 Head Trial. Place the Head Trial onto the stem neck taper and reduce the hip. Leg length equality and proper soft tissue tension are evaluated. Remove the Head Trial and dry the implant trunnion with a laparotomy sponge or sterile towel.

Select the appropriate corresponding V40 Femoral Head (CoCr, Alumina Ceramic, BIOLOX delta Ceramic) or sleeve and place it onto the dry trunnion of the femoral stem with a slight twist. Impact the head with two moderate impactions using the Modular Head Impactor (Figure 16).

Verify the head is secure on the trunnion after head impaction by applying traction to the head and confirming stability on the trunnion. If necessary, the head can be removed utilizing the head disassembly instrument.

Relocate the femoral head into the acetabular cup and re-check the hip biomechanics. The surgical site is then closed according to surgeon preference.

* If a ceramic head is placed on the trunnion and then removed, it must be replaced with a V40 cobalt chrome head or a V40 Titanium Adaptor Sleeve (17-0000E) and a C-Taper ceramic head.

If the stem must be removed, utilize the Modular Threaded Stem Inserter.

* If a ceramic head is placed on the trunnion and then removed, it must be replaced with a V40 cobalt chrome head or a V40 Titanium Adapter Sleeve (17-0000E) and a C-Taper ceramic head.

In no instance should any attempt be made to pre-assemble the adaptor sleeve inside the BIOLOX delta Universal Ceramic Head.

Intra-operatively assemble the BIOLOX delta Universal Taper Ceramic Head onto the sleeved femoral stem and set with two moderate strikes using the Head Impactor (6626-0-140). Care must be taken to avoid excessive impact forces when assembling the Ceramic Head to the sleeved femoral component.

Select the appropriate corresponding V40 Femoral Head (CoCr, Alumina Ceramic, BIOLOX delta Ceramic) or sleeve and place it onto the dry trunnion of the femoral stem with a slight twist. Impact the head with two moderate impactions using the Modular Head Impactor (Figure 16).

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Literature Number: LSP76 Rev. 3
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