

Technique described by

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Introduction

Removal of hip implants is one of the most challenging procedures orthopaedic surgeons face. Preoperative planning is difficult and often the extent of loosening cannot be assessed until the implant is fully exposed. In addition, the many different prosthetic designs require various removal techniques. For this reason, Smith & Nephew offers a full line of implant removal instruments. The RENOVATION® Implant Removal System provides a complete and concise set of instrumentation required for implant and cement removal. A variety of instruments is provided for the removal of acetabular and femoral implants and the fragmentation and removal of bone cement.

Although challenging, preoperative planning is the key to prosthetic removal. Familiarity with the design of the prosthesis being removed is critical as some design features increase the difficulty of removal and require specialized instrumentation and techniques. The following is a guide to the Smith & Nephew RENOVATION Implant Removal instrumentation and suggested techniques employed in prosthesis removal.

Nota bene

The following technique is for informational and educational purposes only. It is not intended to serve as medical advice. It is the responsibility of treating physicians to determine and utilize the appropriate products and techniques according to their own clinical judgment for each of their patients. For more information on the product, including its Indications for Use, contraindications, cleaning, sterilization and product safety information, please refer to the product's label and the Instructions for Use (IFU) for the product.

Acetabular implant removal

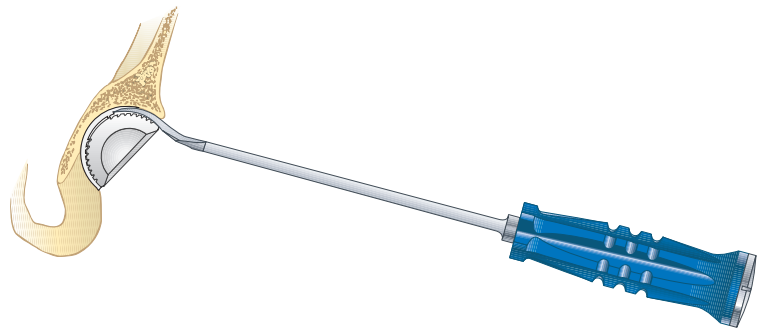
Curved Acetabular Chisel

The Curved Acetabular Chisel (71367544) is used to loosen the cemented acetabular component. It can be used to either chip away cement surrounding the prosthesis, taking care to minimize damage to the bone, or to develop a plane between the prosthesis/cement interface.



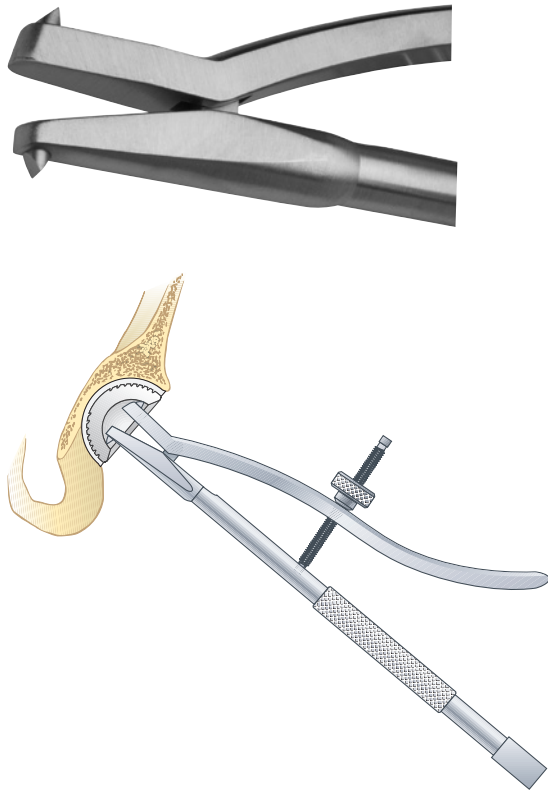
Small Acetabular Gouge

If the acetabular prosthesis is not sufficiently loose after attempting to use the Acetabular Component Gripper (71367542), the Small Acetabular Gouge (71367567) may be used to free the prosthesis. The Small Acetabular Gouge is used to develop a plane at the prosthesis/cement interface. To preserve acetabular bone, avoid using this instrument at the cement/bone interface. Care should be taken to avoid levering against the acetabular bone.



Acetabular Component Gripper

Use the Acetabular Component Gripper (71367542) to extract a cemented acetabular prosthesis that is clinically loose or has been loosened. The spiked end of the Gripper is used to grip the polyethylene liner and is designed to accommodate liners with inner diameters ranging from 22mm to 32mm. In some cases, only the Gripper will be necessary and can be used to manipulate the prosthesis. The Small Slap Hammer (71367541) can be screwed into the end of the Gripper for more difficult extractions.



Round Acetabular Cement Splitter

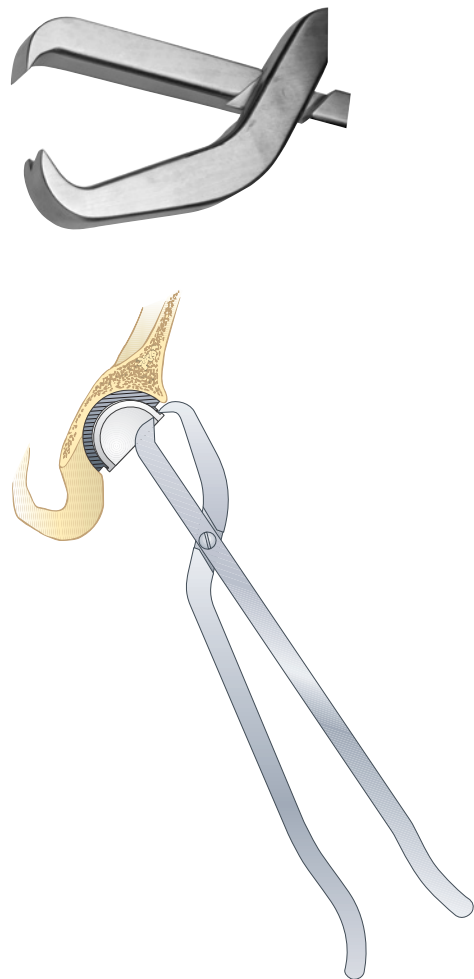
After the cemented acetabular prosthesis is removed, the Round Acetabular Cement Splitter (71367545) can be used to fragment the remaining cement shell. Its curved surface is similar to that of the acetabular cement shell, and its sharp edge easily fragments the cement for removal. Care should be taken to fragment cement into small pieces and not to damage the medial wall of the acetabulum or to drive cement into the pelvis. Small osteotomes may be beneficial in fragmenting and removing plugs of cement from anchoring holes.



Acetabular implant removal

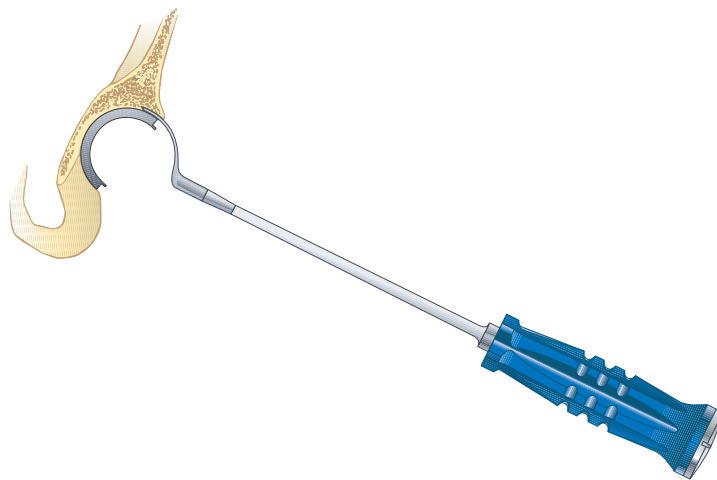
Acetabular Component Forceps

The Acetabular Component Forceps (71367543) have a dual purpose. The primary function is to grasp and manipulate a loose acetabular prosthesis. As a secondary function, it can be used in some cases to separate the polyethylene liner from a metal shell. To accomplish this, the “V” notched inner jaw is placed inside of the polyethylene liner while the sharp edge of the wedged jaw is placed into the interface between the metal shell and the liner. As pressure is applied, the liner will separate from the metal shell as it displaces along the inclined surface of the wedged jaw.



Acetabular Gouges

The Acetabular Gouges (71367546, 71367550, 71367554, 71367558, and 71367562) are designed to disrupt the biological fixation of porous acetabular components. Five sizes, 46, 50, 54, 58 and 62mm, are offered to complement the contour of most porous acetabular components. Once the liner and any screws have been removed, the Acetabular Gouges are used to create a separating plane at the prosthesis/bone interface. The Acetabular Gouges feature sharp edges on all three sides for maximum cutting efficiency. Care should be taken to avoid levering against the acetabular bone.

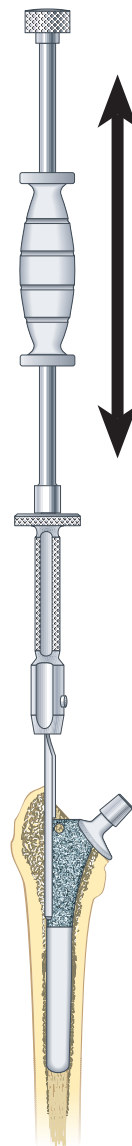


Femoral implant removal

Radial Osteotome Blades

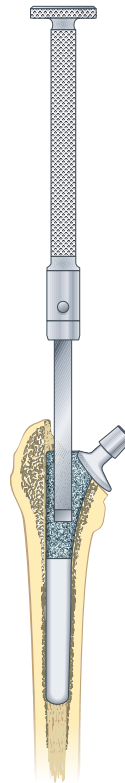
Four Radial Osteotome Blades (71369310, 71369312, 71369314, and 71369316) and Short and Long Quick-Coupling Osteotome Handles (71367548 and 71367549) can be used to disrupt biological fixation in the lateral portion of a proximally porous-coated femoral component. The blades are rigid and curved to match the lateral contour of the implant. One edge is beveled to ensure cutting against the implant. The beveled side should be placed away from the implant, toward the bone.

The Small Slap Hammer (71367541) is easily attached to the osteotome handle for insertion and extraction.



Thin Osteotome Blades

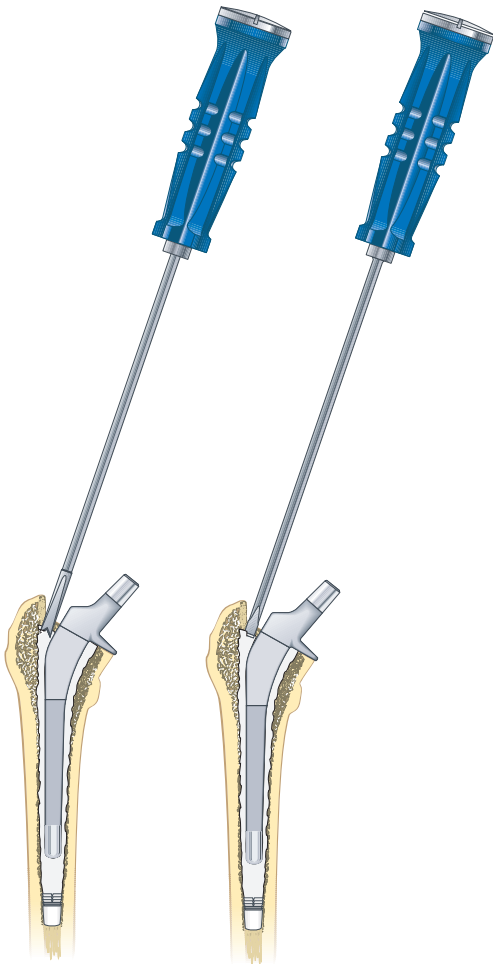
A variety of sizes in the Thin Osteotome Blades and Short and Long Quick-Coupling Handles (71367548 and 71367549) can be used to disrupt biological fixation in the anterior and posterior portion of a proximally porous-coated femoral component. The blades are flexible enough to follow the contour of a femoral or acetabular component, and one edge is beveled to ensure cutting against the implant. The beveled side should be placed away from the implant, toward the bone. After disrupting areas of ingrowth with the osteotomes, attempt to extract the stem using moderate force. If the stem cannot be extracted without risk of fracturing the femur, an extended trochanteric osteotomy may be required. An extended trochanteric osteotomy is often required for extensively porous-coated stems.



Femoral implant removal

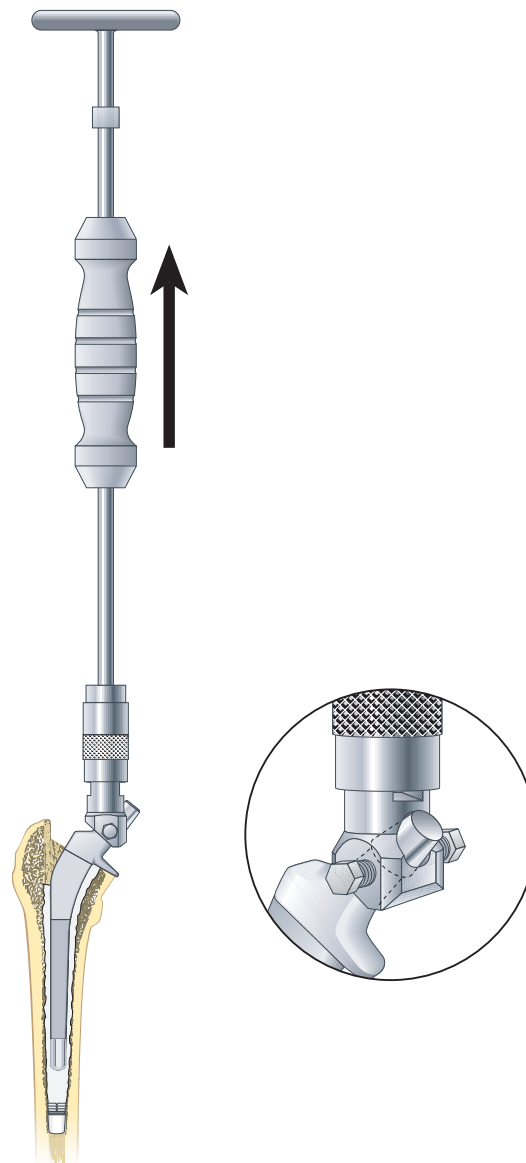
“V” Splitter and Chisel

The “V” Splitter (71367561) and Chisel (71369308) are used to fragment and remove any cement proximal and lateral to the prosthesis. Before attempting to extract a cemented femoral prosthesis, cement should be removed from the lateral aspect of the femoral stem or fracture of the greater trochanter may occur. The “V” Splitter and Chisel can also be used to fragment cement in the proximal region after the prosthesis is removed.



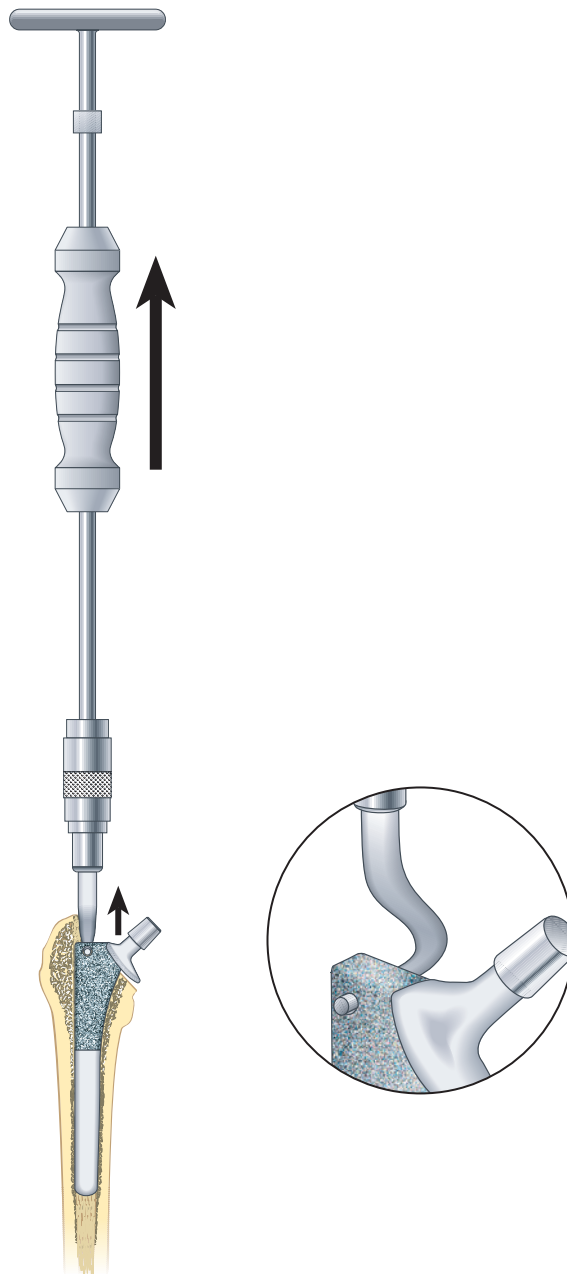
Modular Stem Extractor

When the proximal cement has been adequately removed or biological fixation has been disrupted, the Modular Stem Extractor (71367555) can be used in conjunction with the Large Slap Hammer (71367553) to extract the prosthesis. The Modular Stem Extractor is designed so that the line of action is parallel to the longitudinal axis of the prosthesis. If the extractor does not readily remove the stem, further interface disruption must be accomplished or fracture of the surrounding femur may occur. The two locking screws on the Modular Adapter should be positioned behind the taper and tightened with the T-Handle Wrench (71367556).



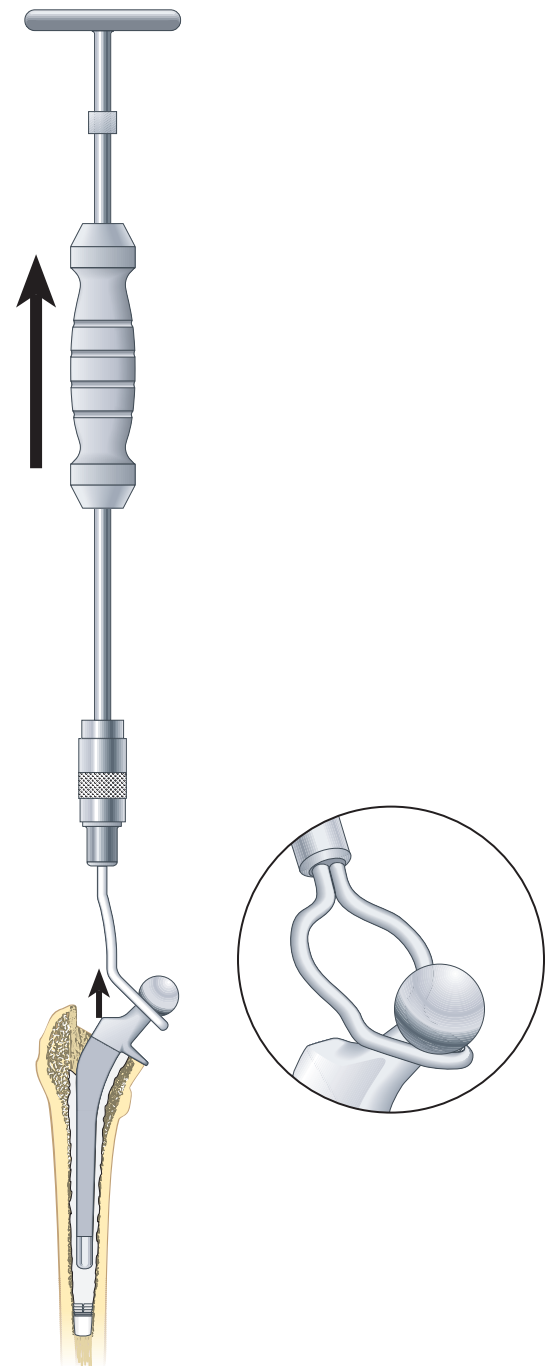
Hook Stem Extractor

If a proximal extraction hole is exposed, the Hook Stem Extractor (71367557) can be used with the Large Slap Hammer (71367553) to remove the prosthesis. The Hook Stem Extractor is designed to fit most prostheses with a proximal extraction hole. If the extractor does not readily remove the stem, further interface disruption must be accomplished or fracture of the surrounding femur may occur.



Fixed Head Stem Extractor

With a one-piece femoral prosthesis, the Fixed Head Stem Extractor (71367559) can be used with the Large Slap Hammer (71367553) to remove the prosthesis. The Fixed Head Stem Extractor is designed to fit over the femoral head of the prosthesis and engage the neck. If the extractor does not readily remove the stem, further cement removal must be accomplished or fracture of the surrounding femur may occur.



Femoral implant removal

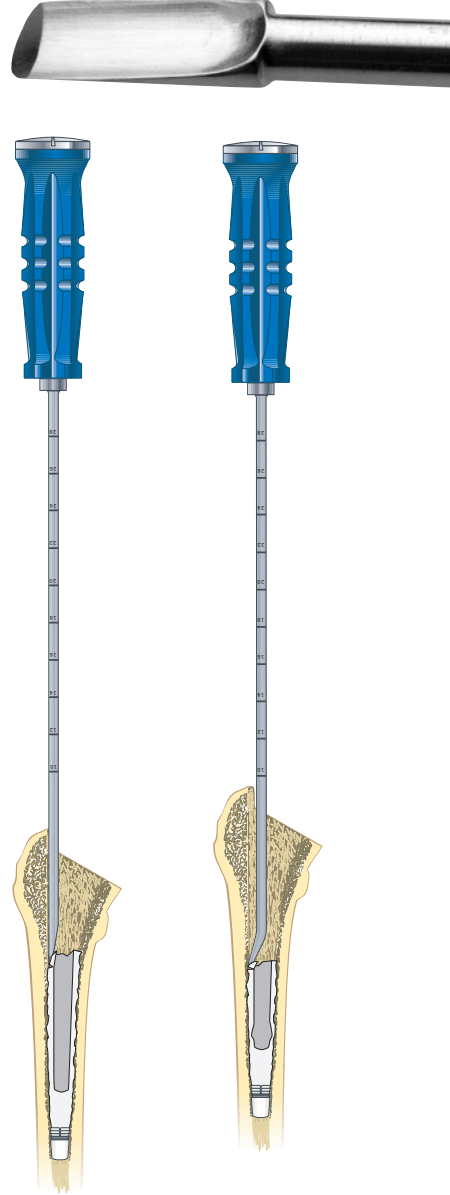
Flag Splitter

Once the cemented femoral component has been removed, the Flag Splitter (71367560) may be used to make longitudinal fractures in the proximal cement mantle. This instrument offers a slightly longer tip to guide the cutting edge along the cement mantle.



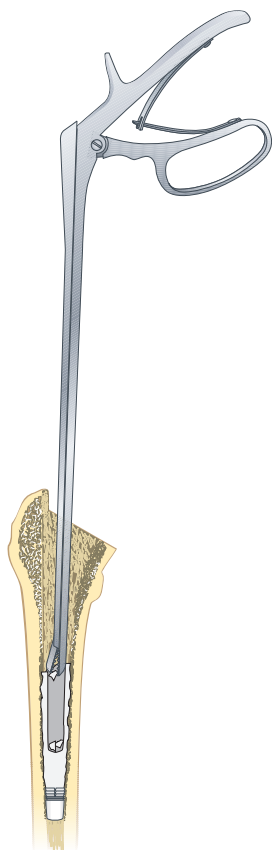
Straight and Angled Gouges

The Straight Gouge (71367564) and Angled Gouge (71367563) can be utilized to remove cement in the middle and distal third regions of the cement mantle. Preferably, these gouges are used after splitting an intact cement mantle with the Flag Splitter. Care should be taken to avoid penetrating the cortical surface of the bone.



Rongeurs with Teeth

The Rongeurs with Teeth (71369200 and 71369300) may be used to grasp loose cement particles in the femoral canal. The two lengths, 200mm and 300mm, are designed to grasp loose cement in the proximal and distal portion of the femoral canal.



"X" Osteotome

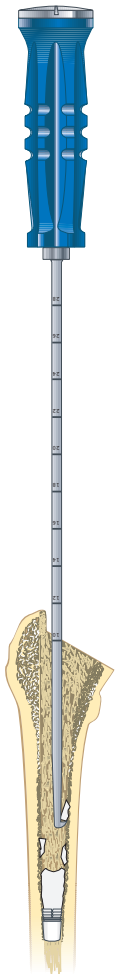
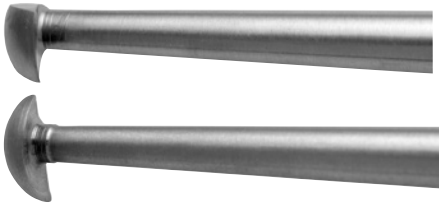
The "X" Osteotome (71369207) is very effective in removal of cement distal to the tip of the implant. It is used to progressively fragment the hard cement in this region as it is impacted and rotated repetitively.



Femoral implant removal

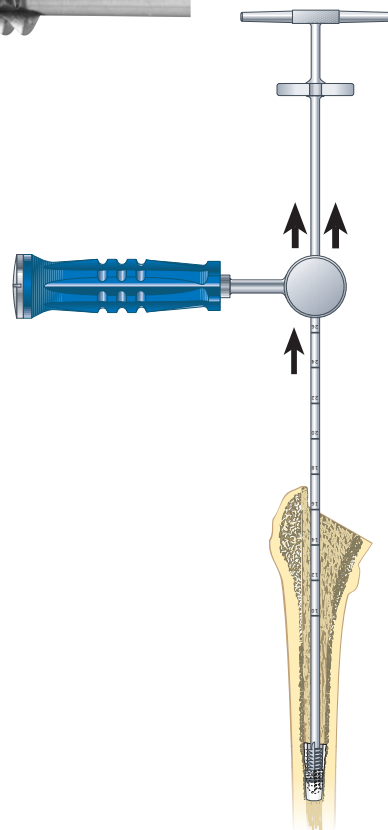
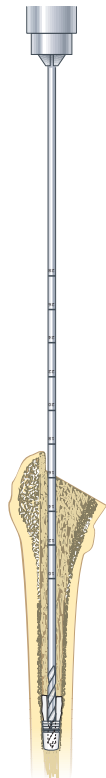
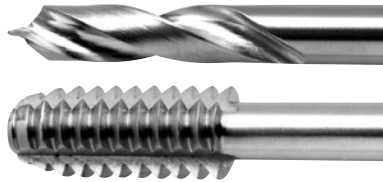
Reverse Curettes

The Reverse Curettes (71369517 and 71369519) come in two widths, 7mm and 9mm. They are primarily used to scrape along the inside of the canal to remove any remnants of the cement mantle or residual membrane after cement removal.



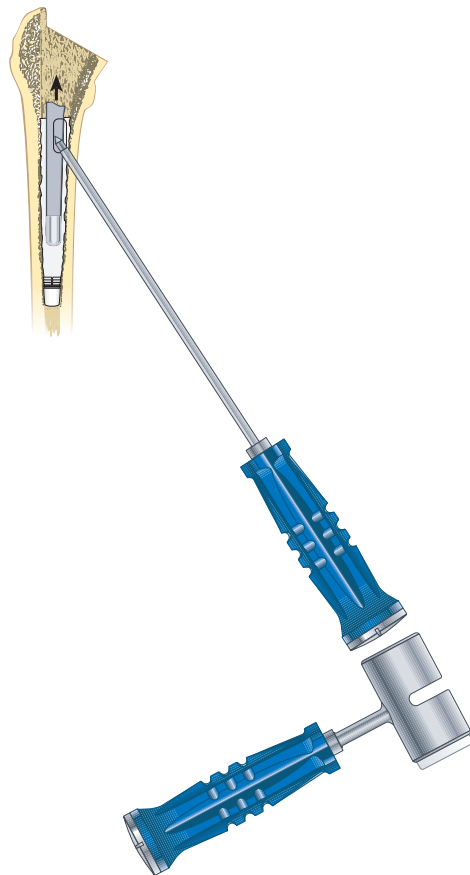
Cement Drills and Conical Taps

If the distal cement mantle is intact and loose, the Cement Drills (71369045, 71369006, and 71369008) and sharp-threaded Conical Taps (71369007 and 71369009) can be used to extract the distal cement mantle as a large fragment. The risk of cortical perforation should be assessed through A/P and lateral radiographs prior to introducing the Cement Drill. Care should be taken not to introduce the drill into an eccentrically placed channel. The Cement Drills are offered in three diameters, 4.5mm, 6mm, and 8mm, and are used to create a pilot hole into the cement restrictor through which the Conical Taps are passed. The Conical Taps also come in two diameters, 7mm and 9mm, and are used in conjunction with the Slotted Mallet (71367552). After the appropriate size tap is chosen, several sharp turns embed it into the cement restrictor. The Slotted Mallet is then impacted against the collar to extract the distal cement.



Carbide Punch

In the case of a fractured femoral stem, the proximal portion is usually loose and easily removed. In contrast, the distal portion remains fixed in the remaining cement mantle. The Carbide Punch (71367566) is an effective tool for removing the distal portion of the fractured stem. A longitudinal slot is created just distal to the top of the broken prosthesis to allow access to the broken fragment directly. The Carbide Punch is then used to make divots in the surface of the prosthesis and drive the prosthesis proximally.



Catalog information

| Catalog Item | Description |
|--|--|
| 71367575 | RENOVATION® Implant Removal Kit |
| Includes the Acetabular and Femoral Implant Removal Trays and Instruments. Disposable Osteotome Blades are not included. | |

| Catalog Item | Description |
|-----------------|--|
| 71367576 | Acetabular Implant Removal Tray |
| | Tray Accepts the Following: |
| 71367577 | Acetabular Implant Removal Tray Insert |
| 71367547 | Osteotome System Tray Insert |
| 71367541 | Small Slap Hammer |
| 71367542 | Acetabular Component Gripper |
| 71367543 | Acetabular Component Forceps |
| 71367544 | Curved Acetabular Chisel |
| 71367545 | Round Acetabular Cement Splitter |
| 71367548 | Quick-Coupling Osteotome Handle, Short |
| 71367549 | Quick-Coupling Osteotome Handle, Long |
| 71367546 | Acetabular Gouge, Size 46 |
| 71367550 | Acetabular Gouge, Size 50 |
| 71367554 | Acetabular Gouge, Size 54 |
| 71367558 | Acetabular Gouge, Size 58 |
| 71367562 | Acetabular Gouge, Size 62 |
| 71367567 | Small Acetabular Gouge |
| | Disposable Osteotome Blades (Sterile) |
| 71369310 | Radial Osteotome Blade, Size 10 |
| 71369312 | Radial Osteotome Blade, Size 12 |
| 71369314 | Radial Osteotome Blade, Size 14 |
| 71369316 | Radial Osteotome Blade, Size 16 |
| 71369208 | Thin Osteotome Blade, 8mm x 3" |
| 71369210 | Thin Osteotome Blade, 10mm x 3" |
| 71369212 | Thin Osteotome Blade, 12mm x 3" |
| 71369220 | Thin Osteotome Blade, 20mm x 3" |
| 71369412 | Thin Osteotome Blade, Rounded End, 12mm |
| 71369420 | Thin Osteotome Blade, Rounded End, 20mm |
| 71369410 | Thin Osteotome Blade, 10mm x 5" |
| 71369408 | Thin Osteotome Blade, 8mm x 5" |

| Catalog Item | Description |
|-----------------|--|
| 71367578 | Femoral Implant Removal Tray |
| | Tray Accepts the Following: |
| 71367579 | Femoral Implant Removal Tray Insert #1 |
| 71367580 | Femoral Implant Removal Tray Insert #2 |
| 71367552 | Slotted Mallet |
| 71367553 | Large Slap Hammer |
| 71367555 | Modular Stem Extractor |
| 71367556 | T-Handle Wrench |
| 71367557 | Hook Stem Extractor |
| 71367559 | Fixed Head Stem Extractor |
| 71369007 | Conical Tap, 7mm |
| 71369009 | Conical Tap, 9mm |
| 71369045 | Cement Drill, 4.5mm |
| 71369006 | Cement Drill, 6mm |
| 71369008 | Cement Drill, 8mm |
| 71367560 | Flag Splitter |
| 71367561 | "V" Splitter |
| 71369308 | Chisel, 8mm x 17" |
| 71367563 | Angled Gouge |
| 71367564 | Straight Gouge |
| 71367566 | Carbide Punch |
| 71369517 | Reverse Curette, 7mm x 17" |
| 71369519 | Reverse Curette, 9mm x 17" |
| 71369207 | "X" Osteotome, 7mm x 17" |
| 71369200 | Rongeur 200mm with Teeth |
| 71369300 | Rongeur 300mm with Teeth |

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