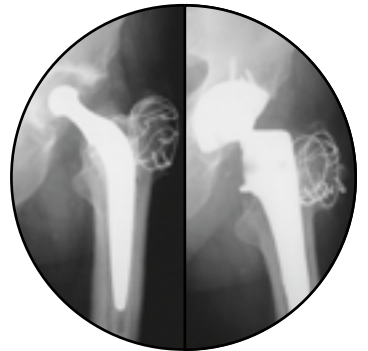


# **ULTRA-DRIVE<sup>®</sup>**

**Ultrasonic Revision System**



**BIOMET**  
ORTHOPEDICS, INC.

# Ultra-Drive<sup>®</sup> 3

- Tactile and audible feedback when impacting cortical bone or the implant
- Effective in porous coated implant and acetabular component removal
- Shortens time spent removing cement
- Less traumatic for patients and surgeon
- Quicker recovery time



# Control Panel Highlights

**Main Power Control** – Power switch and indicator.

**UltraSonic Power Display and Control** – Adjustable in increments of five from 30% to 100%. Default is set at 70%.

**Handpiece Technique Display** – Three color graph indicating actual power to the handpiece. Optimum area is top 20% of green, yellow when approaching overload, and red when tool tip and handpiece are being overloaded.

**Volume Display and Control** – Two available modes. CONSTANT TONE mode delivers a constant tone whenever handpiece is activated. An intermittent tone will sound when handpiece reaches overload conditions. HANDPIECE TECHNIQUE mode emits a low frequency tone in normal operation. A higher frequency tone can be heard when the optimum power area range is attained.

**Diagnostic Faults** – If the system detects a fault sufficient to render the system inoperable, the appropriate fault symbol will illuminate.

**FootSwitch** – Enables foot control of the ultrasonic power and irrigation flow to the handpiece.

**Handpiece** – Inputs for two handpieces with the ability to toggle between the Yellow (A) and Blue (B) connection. When alternating from Yellow and Blue, power and flow settings remain at the last setting used until manually changed.

**Peristaltic Pump** – High speed pump capable of delivering 250ml per minute. Irrigation is used to cool both the tool tip/cement interface as well as softened cement, preventing it from reflowing back into area it was just removed from.

# Instrument Tray Features

**Irrigation Clip** – Two curved metal clips used for irrigation.

**Hand Piece** – The ultrasonic handpiece.

**Slide Hammer** – A long metal rod with a sliding handle and a cylindrical end.

**Double Wrench** – A metal wrench with two open ends.

## Carrying Case

All-inclusive shipping case with wheels and retractable handle. Custom foam cut-outs ensure all components are packed away properly and safely.



## Proven Results



Case #1: Preoperative—A failed prosthesis with proximal and distal cement mantles.



Case #1: Postoperative—Using an Ultra-Drive® short osteotome and plug puller, the cement was removed completely with plug intact.



Case #2: Preoperative—A failed acetabular component with massive cement pocket.



Case #2: Postoperative—An Ultra-Drive® plug puller provided the means of completely removing the difficult cement mass.

# Complete Choice of Tip Extenders



**423840**  
180mm Extender  
**423838**  
120mm Extender  
**423836**  
60mm Extender



**423830**  
7° M/F Extender  
**423828**  
5° M/F Extender  
**423826**  
3° M/F Extender  
**423842**  
Straight 180mm M/F Extender

## A Tool For Every Job



**423856**  
Acetabular Gouge



**423859**  
5.0mm Reverse Curette



**423864**  
5.0mm Hoe



**423868**  
6.0mm Plug Puller



**423876**  
8.0mm Gouge



**423880**  
9.5mm Short Osteotome



**423881**  
9.5mm Knee Osteotome



**423883**  
6.5mm Straight Knee Osteotome



**423890**  
6.0mm Long Straight Osteotome



**423892**  
6.0mm Long Curved Osteotome



**423894**  
7.0mm Long Porous Gouge



**423921** (4.0mm)  
**423922** (5.5mm)  
**423923** (7.0mm)  
**423924** (9.5mm)  
**423925** (11.0mm)  
**423926** (13.0mm)  
Helix Tip



**423871** (7mm)  
**423872** (9.5mm)  
**423873** (11mm)  
**423874** (13mm)  
Disk Drills

# Surgical Technique

## Femoral Component Removal

### Cemented

The Ultra-Drive® System is helpful in the removal of well-fixed cemented implants by using a series of tool tips. To break the implant-cement interface, turn the ultrasonic U/S power control knob to the 70% power setting. Use the 9.5mm osteotome under heavy irrigation and begin working between the stem/cement interface with an up-and-down piston-like motion. If the stem is still well-fixed in the cement after this step, then a 6mm straight osteotome can then be utilized (Figure 1). Make sure that the tip is in contact with the cement mantle before power is applied via the footswitch.\* Guide the tool tip along the anterior and posterior planes of the implant. Use a constant up-and-down motion with heavy irrigation to ensure that the osteotome is not sealed into the cement as it repolymerizes. In a similar fashion, use the 6mm curved osteotome to separate the medial interface (Figure 2) and the 7mm porous gouge to separate the lateral interface.

**NOTE:** Upon contact with the implant, you may hear a high-pitched noise. Should this occur, avoid forcing the tip into the implant as this may damage the tip. It is appropriate however, to pass the tool tip as close to the implant as possible: occasional contact is to be expected. The ultrasonic instruments and extenders supplied with the Ultra-Drive® System are specifically designed for use only while functioning in the ultrasonic mode. They are not intended to be used manually. Using the ultrasonic instruments in a manner similar to a manual tool may result in marginal or unacceptable ultrasonic cement removal and damage to the handpiece (hand tools are used to supplement ultrasonic cement removal techniques).

### Non-Cemented

The technique for non-cemented, porous coated implant removal is almost identical to that of cemented components. The only difference is the increased noise generated as the tool tip rubs against the component. The most important point is to go slow, take short cuts straight inward (1/2 inch or less) and slowly work around the component one straight cut at a time. Do not torque, twist, or use side-to-side motions and be sure to use plenty of irrigation. If using an Ultra Drive® Model 50 or 100, a bulb irrigator should be used along with the Ultra-Drive® irrigation pump to ensure proper cooling takes place.



Figure 1



Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

## Cement Mantle Preparation

Cement in the femoral canal can be debulked using the 8mm gouge (Figure 3) or reverse curette (Figure 4). The reverse curette features reverse cutting when moving distally-to-proximally within the canal. The curette works well for removing any retained cement during final canal preparation.

Using the ultrasonic short osteotome (9.5mm), create three or four longitudinal troughs (Figure 5) down the entire length of the cement mantle. If creating three troughs, place them at 12, 4 and 8 o'clock. Four troughs should be positioned at 12, 3, 6 and 9 o'clock as shown in the diagram.

To cut the troughs, proceed distally using a side-to-side oscillating motion to widen the trough. Use the same motion while drawing the osteotome proximally.

**NOTE:** Failure to widen the trough will allow softened cement to flow back into the trough, effectively blocking movement of the tool tip. The thicker the cement mantle, the wider the trough required. It is also important to maintain constant irrigation, and to use a side-to-side oscillating motion to ensure that the osteotome is not sealed into the cement.

**OPTIONAL:** In some cases it may be easier to section the cement mantle transversely, as well as longitudinally, for easier removal. The hoe tip (Figure 6) is angled to cut through the cement perpendicular to the femoral shaft. The hoe is not designed for distal-to-proximal, proximal-to-distal motion. Use this tip in a lateral-to-medial, medial-to-lateral motion to create a circumferential trough in the cement mantle perpendicular to the femoral shaft.

## Cement Mantle Removal

Using the short osteotome (Figure 7), follow the cement-bone interface, again using irrigation along with a side-to-side motion of the tool tip to allow the introduction of saline between the bone and cement.

Once the initial path has been created with the ultrasonic short osteotome, introduce a manual osteotome between the bone and cement to gently loosen large sections of the cement. Carefully remove loosened sections of cement from the medullary canal. Pieces of cement can be grasped and removed with forceps or a rongeur.

**WARNING: DO NOT USE the ultrasonic handpiece to pry cement.**

*\*The power control knob should be changed from a setting of 70% to 50% when the longer tool tips are used. Ultrasonic power should not be applied until the tool tip is in contact with the surface that is to be disrupted.*

# Surgical Technique

## Bone Plug Evaluation

Evaluate bone plug position and fixation to determine which of the following classifications applies (see diagrams shown on opposite page).

### Type-A Plug Removal

For Type-A bone plugs, assemble the short extender, male/female extender and plug puller. With the Ultra-Drive® power on, sink the plug puller tip completely into the plug until only the base of the collar is visible proximally (Figure 8). Simultaneously turn off the power and rotate the handpiece gently 90 degrees clockwise. Hold the handpiece still until the cement solidifies again (15 seconds). The ultrasonic plug puller tip should be securely engaged in the bone plug. Remove the handpiece and the short extender. Attach the slide hammer to the plug puller adapter, and the plug puller adapter to the male/female extender: gently tap the plug free. If the plug does not dislodge, DO NOT use progressively greater force. Just remove the plug puller adapter and slide hammer, reattach the short extender and handpiece, power out the plug puller, and follow the steps for Type-B plug removal.

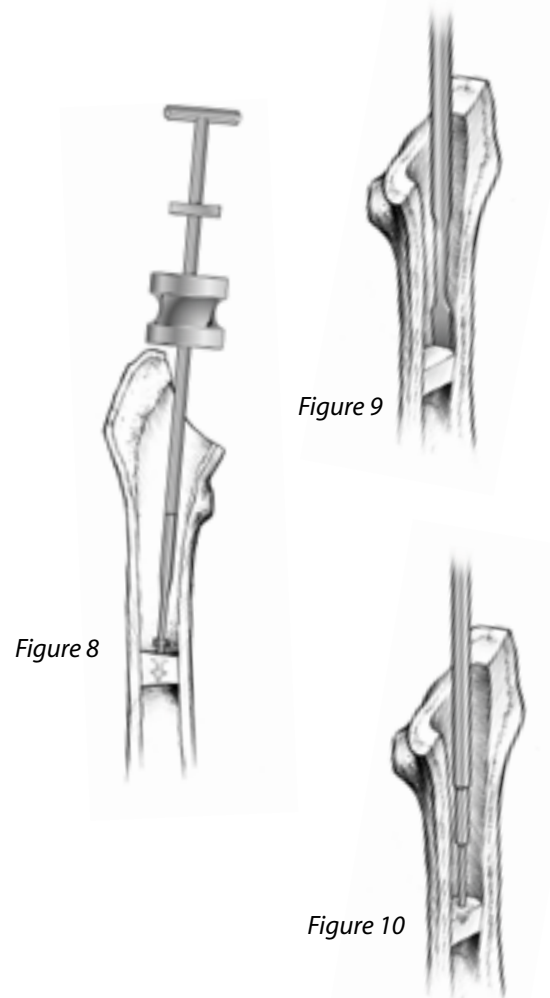
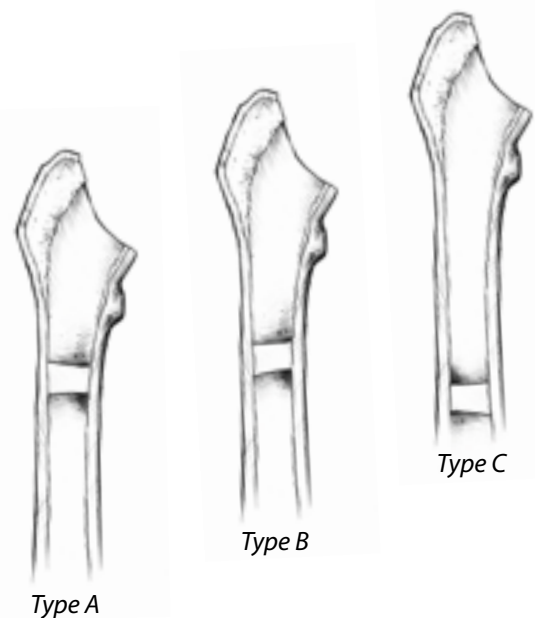
### Type-B Plug Removal

Attach the short osteotome to the handpiece with the appropriate length extender. Make a pass around the periphery of the bone plug (Figure 9), heavily irrigating while using a gradual plunging motion. This action will help to loosen the plug. Then repeat the process for Type-A plug removal. If the plug does not dislodge, proceed to Type-C plug removal.

### Type-C Plug Removal

Tightly lodged plugs, or plugs distal to the isthmus, must be converted to hollow cylinders before removal. This is accomplished using a helix tip to perforate the plug (Figure 10), followed by progressively larger diameter helix tips. Using ultrasonic power and heavy irrigation, introduce the helix tip through the plug until only the hub of the tip is visible above the bone plug. The spiral configuration will allow cement to exit proximally. Withdraw the helix tip under power to help evacuate the cement. Wipe off cement and continue drilling until the plug is hollow. Introduce progressively larger tips in this fashion until the cement mantle is reduced to a thickness of only 2–3mm. Using techniques described earlier for cement mantle removal, the remaining 2–3mm of cement can be removed.

**NOTE:** The helix can be used in a retrograde manner, but at reduced efficiency. **FINAL CLEAN-UP:** The reverse curette works well for clean-up. Place the reverse curette distal to the plug site and gently pull proximally. This procedure allows the surgeon to distinguish between cortical bone and retained cement. **WARNING: Tool tips will be hot once extracted from cement.**





## Acetabular Component Removal



Figure 11



Figure 12

Engage the ultrasonic acetabular gouge (Figure 11) into the mantle at the acetabulum-cup-cement border. **IMPORTANT:** The gouge must be initially engaged WITH THE POWER OFF to avoid whipping and possible cracking of the tip. If the gouge should crack, it is unusable and must be replaced with a new gouge tip. Apply power after the gouge tip is engaged. Carefully work the gouge along the interface in an arc that matches the cup shape. Draw the gouge in-and-out around the circumference of the cup in order to create a concentric void area behind the cup. This motion must also be back-and-forth with heavy irrigation to avoid sealing the gouge within the cement, or causing excessive temperatures at the tool tip-cement interface. After the interface between the cement and acetabular cup is broken, gently remove the cup from the cement mantle. Attach the ultrasonic short osteotome to the handpiece. Using a back-and-forth motion and heavy irrigation, section the cement into thirds (Figure 12), radiating from the apex toward the circumference of the cement-covered acetabulum. Gently pry the triangular sections of bone cement from the acetabulum with a hand chisel. Care must be taken to avoid contact between the ultrasonic instruments and either cortical bone or the metal acetabular cup. A distinctive sound and tactile resistance will be noted when either the bone or acetabular component is encountered. If this distinct sound is heard or tactile response occurs, remove the ultrasonic instrument from the cement mantle and reintroduce the instrument at an adjusted angle to avoid contacting either the bone or component.

**NOTE:** To remove acetabular poly, section the poly in a similar fashion while using heavy irrigation. The tool tip will cut more slowly through the poly than through cement. Remove sections with manual tools.

## Set-Up and Operational Checks

Recommended set-up and check-out procedures for the Ultra-Drive® System are described in the Operator's Manual. The steps apply to revision surgery, and presume a minimum surgical team of three people: surgeon and scrub nurse in the sterile field, and a circulator in the nonsterile field. Any questions pertaining to set-up and check-out procedures should be directed to your Biomet Representative.

## Preoperative Planning

During preoperative planning, evaluate the thickness of the cement mantle. If the mantle is more than 3mm thick, use a gouge or reverse curette to reduce the thickness of the cement mantle to 2–3mm. Preoperative planning is essential in determining the appropriate approach to removing cement plugs.

## Operational Hints

Light pressure (7lbs.) applied to these tools will move them easily through the cement at a rate of approximately 1–3mm per second. The instruments should be guided, not forced. **DO NOT FORCE**, as it is likely cortical bone has been encountered. "If the tool stops, the surgeon should stop."

**IMPORTANT:** While using the Ultra-Drive® System, it is essential to employ constant irrigation to cool the cement as it releases heat.

*The Ultra-Drive® was developed in conjunction with James T. Caillouette, M.D. and Robert C. Klapper, M.D.*

*Biomet, as the manufacturer of this device, does not practice medicine and does not recommend this or any other surgical technique for use on a specific patient. The surgeon who performs any implant procedure is responsible for determining and utilizing the appropriate techniques for implanting the prosthesis in each individual patient. Biomet is not responsible for selection of the appropriate surgical technique to be utilized for an individual patient.*

### U.S. Patent Numbers

5,019,083	D340,981
D341,201	D341,202
D339,419	5,045,054
4,248,232	5,324,297
5,318,570	D342,313

Ultra-Drive® is a registered trademark of Biomet, Inc. or one of its Subsidiaries.

# Ordering Information

## Primary Components

### Ultra-Drive® 3 Console

423935

### Ultra-Drive® 3 Handpiece

423936

### Ultra-Drive® 3 Footswitch

423937

### Ultra-Drive® 3 Instrument Tray

423938

### Ultra-Drive® 3 Shipping Case

423941

### Ultra-Drive® 3 Package Set

423955

Package set comes complete with all Primary components and two handpieces

## Accessories

### Double Sided Wrench

423837

### EZ AIM3 Irrigation Clip

423939

### Plug Puller Adaptor (T-Handle)

423818

### 1 lb Slide Hammer

423819

## Disposable Equipment

### Irrigation Tubing (Single)

423834

### 56mm x 85 Acetabular Gouge

423856

### 5mm Reverse Curette

423859

### 5mm Hoe

423856

### 6mm Plug Puller

423868

### 8mm Gouge

423876

### 9.5mm Short Osteotome

423880

### 9.5mm Knee Osteotome

423881

### 6.5mm Straight Knee Osteotome

423883

### 6mm Long Straight Osteotome

423890

## Extended Service Agreements

### Console

423805

### Handpiece

423806

### 6mm Long Curved Osteotome

423892

### 7mm Long Porous Gouge

423894

### Helix Tip

423921 4.0mm

423922 5.5mm

423923 7.0mm

423924 9.5mm

423925 11.0mm

### Disk Drill

423871 7.0mm

423872 9.5mm

423873 11.0mm

423874 13.0mm

### Extenders

423826 3° M/F

423828 5° M/F

423830 7° M/F

423842 Straight

180mm M/F

423836 60mm

423838 120mm

423840 180mm

If you have questions or require additional information, contact your local Biomet Representative or:

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