

AXIOM[™]

ULTRASONIC **BONE** CEMENT REMOVAL SYSTEM

*... with a focus on
selective tissue protection*



“A superior arthroplasty revision method going beyond just ‘removing’ the bone cement.”

Axiom™ Ultrasonic Cement Removal System

A Visionary Device Offering Better Results

- ✓ **Selectively remove cement**
- ✓ **Preserving host bone**



Mechanism of Action

Axiom™ Ultrasonic Cement Removal System is used in the removal of synthetic materials like polymethylmethacrylate bone cement (PMMA) in large joint revision procedures. The ultrasonic vibration at the tip of probe softens the cement around the implant. The system is designed and developed to facilitate the removal of bone cement during revision arthroplasty whilst controlling bleeding. The softened material is then scrubbed from the host tissue.

Vibration-generated temperature increase at the tip can transform PMMA from a rigid material to a fluffy malleable form which in turn beefs up the removal process of PMMA from the contact circumference. Technically speaking, the phenomenon of glass transition temperature is realized in changing the form of material by upcoming micro movement and resulting in changing elasticity modules, heat conduction and thermal expansion.

Principle of Operation

Ultrasonic surgery is realized between 20-60 kHz. In principle, the outlet voltage is supplied at 50 to 60 hertz. The generator boosts this frequency to 25-30 kHz. The resulting ultrasonic frequency is delivered into the hand-piece and amplified to the motion. After activation, the handle probe can vibrate 25-30.000 strokes per second and results in cavitation at the surgical site. The system uses this cavitation to soften the cement holding the implant in place.

1) **Selectively remove cement**

Axiom™ Ultrasonic Cement Removal System removes cement selectively during revision arthroplasty. Bone cement has a high capacity for absorbing energy and low thermal conductivity. The substantial temperature increase of the system protects the surrounding tissue during the removal of cement.¹

2) **Preserving host bone**

Axiom™ Ultrasonic Cement Removal System preserves host bone. Ultrasound affects cancellous bone and it is removed when subjected to energy levels applied while removal of cement. Whereas due to design of the probe and levels of energy that are used, cortical bone is not affected. Ultrasound could not be absorbed by bone just as readily as cement and due to both audible and tactile mechanism of the system, probe position within the bone could be detected by surgeons.²⁻³

The Axiom™ Cement Removal System and Accessories may be used as an adjunct to or substitute for manually done PMMA removal procedure in orthopedic surgeries such as hip joint shoulder arthroplasty revision surgeries.

Indications

The Axiom™ Cement Removal System & Accessories are indicated for removal of PMMA in arthroplasty revision surgeries and to be used to scrub, debride, fragment, aspirate and remove undesired and unwanted hard and soft tissue.

References

¹Schultz JM, editor. Treatise on materials science and technology. New York: Academic Press; 1977. Properties of solid polymeric materials. p602.

²Klapper RC, Caillouette JT, Callaghan JJ, Hozack WJ. Ultrasonic technology in revision joint arthroplasty. Clin Orthop. 1992; 285:147-54.

³Brooks AT, Nelson CL, Hofmann OE. Minimal femoral cortical thickness necessary to prevent perforation by ultrasonic tools in joint revision surgery. J Arthroplasty. 1995; 10:359-62

Axiom™ Ultrasonic Cement Removal System should be used by the surgeons who have received the appropriate training.

Axiom™ Ultrasonic Cement Removal System is intended to be used in selectively fragmentation, resection, emulsification, irrigation and/or aspiration of synthetic materials (e.g., polymethylmethacrylate (PMMA) bone cement) during revision surgeries. It can also be used to scrape, debride, fragment, aspirate and remove undesired and unwanted hard and soft tissue. Indications, contraindications and instructions for use can be found on the product labeling supplied with each device.

Product Overview

PRODUCT LIST

Ultrasonic Generator
Ultrasonic Handle CMT (Non-Sterile, Re-Sterilizabile)
Ultrasonic Handle ST (Non-Sterile, Re-Sterilizabile)
Ultrasonic Handle HT (Non-Sterile, Re-Sterilizabile)
Ultrasonic Handle WE (Non-Sterile, Re-Sterilizabile)
Surgical Probe SPR (Non-Sterile, Re-Sterilizabile)
Surgical Probe SPR (Non-Sterile, Re-Sterilizabile)
Probe Torque Tool (Non-Sterile, Re-Sterilizabile)
Foot Switch (Non-Sterile, Reusable)
Serum Hanger (Non-Sterile, Reusable)
Sterilization Case (Non-Sterile, Re-Sterilizabile)
Cement Removal Probe CPI (Sterile, Single-Use)
Cement Removal Probe CP II (Sterile, Single-Use)
Cement Removal Probe CP III (Sterile, Single-Use)
Cement Removal Probe CP IV (Sterile, Single-Use)
Cement Removal Probe CP V (Sterile, Single-Use)
Cement Removal Probe CP VI (Sterile, Single-Use)
Cement Removal Probe CP VII (Sterile, Single-Use)
Cement Removal Probe CP VIII (Sterile, Single-Use)
Cement Removal Probe CP IX (Sterile, Single-Use)
Cement Removal Probe CP X (Sterile, Single-Use)
Cement Removal Probe CP XI (Sterile, Single-Use)
Cement Removal Probe CP XII (Sterile, Single-Use)
Cement Removal Probe CP XIII (Sterile, Single-Use)
Cement Removal Probe CP XIV (Sterile, Single-Use)
Cement Removal Probe CP XV (Sterile, Single-Use)
Cement Removal Probe CP XVI (Sterile, Single-Use)
Cement Removal Probe CP XVII (Sterile, Single-Use)
Cement Removal Probe CP XVIII (Sterile, Single-Use)
Cement Removal Probe CP XIX (Sterile, Single-Use)
Cement Removal Probe CP XX (Sterile, Single-Use)



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U.S. and foreign patents pending
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