CarboJet®

CO₂ Bone Preparation System

A Better Way to Clean Bone

A clinically proven system that removes lipids/marrow elements and fluids from the cement interface to improve cement penetration and bond strength.

Increase Cement Penetration1,2
Increase Bone-Cement Interface Strength3
Reduce Opportunity for Micro-Emboli4
Essential for Tourniquetless TKA5,11
Reduce OR Time and Cost6

Knee and Uni
Hip
Shoulder

Nozzles are available for use in TKA, UKA, THA, TSA, OCA and other cemented reconstructive applications.

KINAMED INCORPORATED

Quality Care. Clinically Proven.
Aseptic loosening is now recognized as the predominant failure mode in primary knee arthroplasty. A recent study of 938 primary knees found that aseptic loosening was the most common mechanism of failure, accounting for 28% of all failures. In UKA, aseptic loosening accounted for more than 60% of failures. These data underscore the importance of achieving optimal cement fixation via meticulous cleaning and drying of the bone bed.

CarboJet’s CO₂ gas jet quickly and thoroughly cleans and dries the bone bed by bringing blood, saline and, most importantly, lipids/fatty marrow elements to the surface where they are easily collected and removed. Cleaning and drying with CarboJet takes no more time than is typically required for drying with lap sponges. The superior cleaning achieved with CarboJet improves cement penetration depth thus offering the potential for a reduction in bone-cement interface stress and increased cement mantle toughness. Increased bone-cement interface strength is the result.

**Clinically Proven**

CarboJet has been proven to be safe and effective in multiple clinical studies and in tens of thousands of joint reconstructions. Discover why so many surgeons are making CarboJet a standard part of their cement technique.

**Cement mantle toughness correlates with cement penetration depth.**

Saline lavage removes gross debris, but fluid remaining in the interstices of bone prevents thorough cleaning.

A compressed gas jet displaces fluid and fluid-suspended debris, thereby cleaning and drying porous structures.

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Bone bed prepared with pulsatile saline lavage. Arrows indicate radiolucent lines.

Bone bed prepared with syringe saline lavage and CarboJet CO₂ Bone Preparation System.

A recent study,¹¹ presented at AAOS 2018 by R. Michael Meneghini, M.D., demonstrates reduced opioid consumption in female patients when a tourniquet was not used in total knee arthroplasty (TKA). CarboJet was used to maximize cement interdigitation – an essential component of the tourniquetless TKA technique. The ability to reduce opioid consumption using this technique is significant, since opioid addiction has become a national crisis, and protocols that result in reduced patient pain are being sought.
Surgeon Testimonials

“I use it on Uni Knees. We often get a lot of bone bleeding – even with a tourniquet during cementation. The CarboJet dries the bone superbly for implantation. Outstanding addition to my surgical technique!!”

Airell Nygaard, MD, Yosemite Joint Replacement, Sonora, CA, USA

“CarboJet provides my patients with a much cleaner, drier bone bed allowing for better cement penetration and hence a better mechanical interface between bone and implant for secure long-term fixation.”

Richard “Dickey” Jones, MD, Dallas, TX, USA

“I have made gas jet lavage with CarboJet the critical last step in bone preparation in all my cemented arthroplasty cases. The removal of additional marrow elements that could otherwise form embolic debris during cement pressurization is important to patient safety.”

H.M. “Mac” Reynolds, MD, Oakland, CA, USA, In Memoriam

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