

# CarboJet<sup>®</sup>

## CO<sub>2</sub> Lavage System

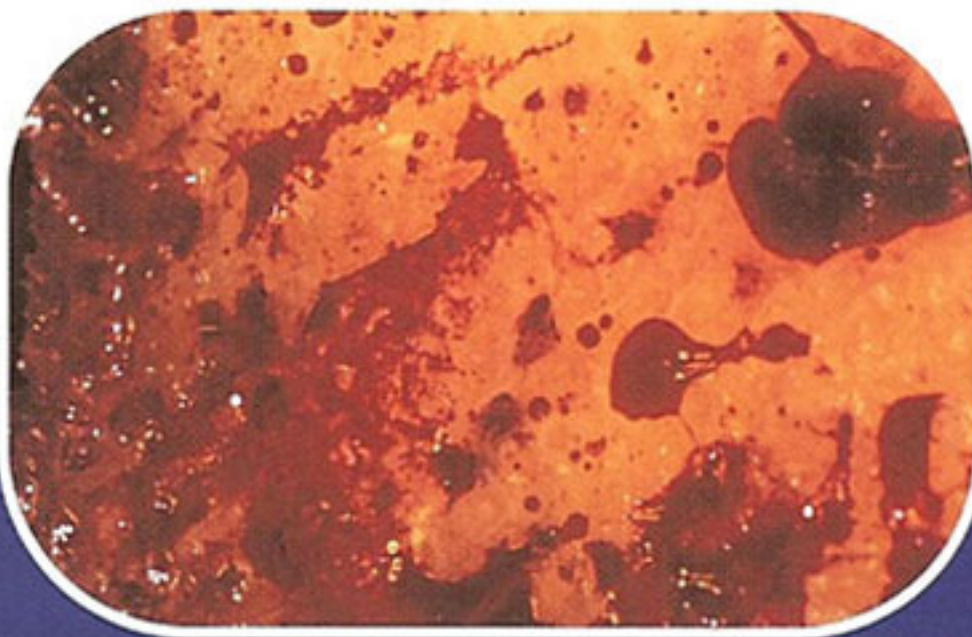
A Better Way to Clean Bone



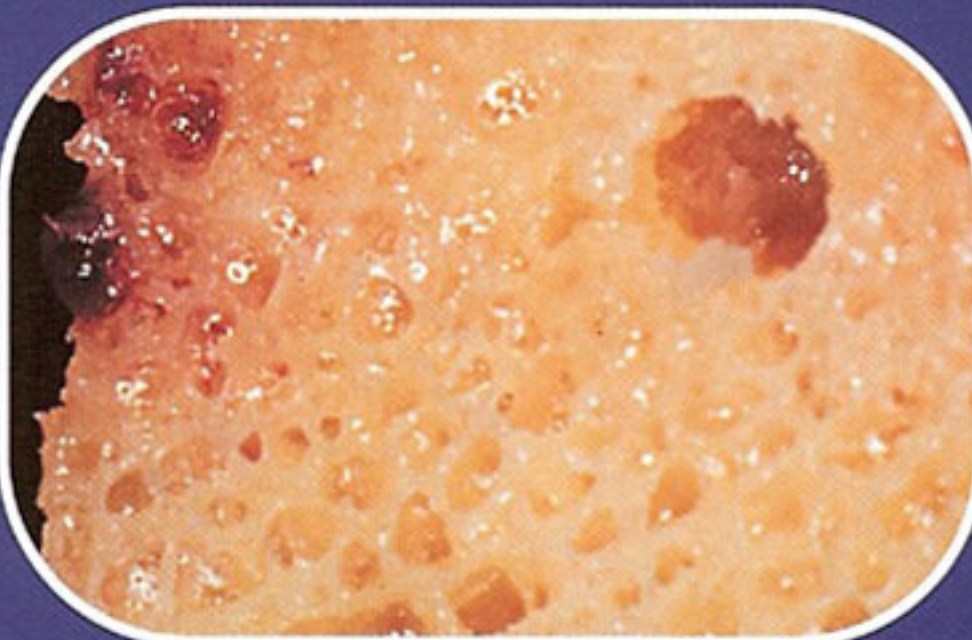
Reduced Debris Arthroplasty™

Reduced Opportunity For Micro-Emboli

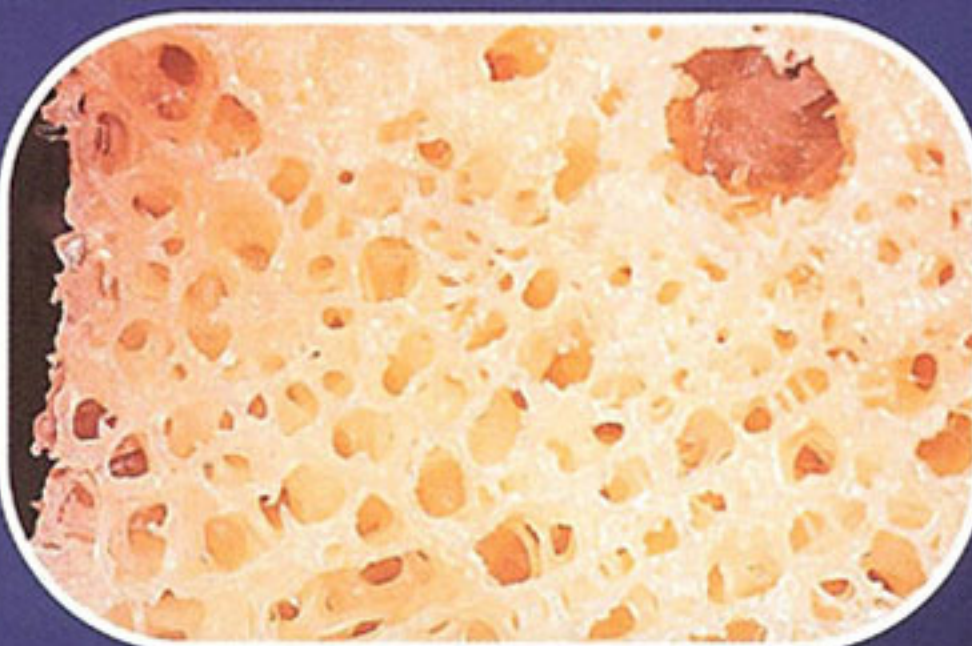
Increased Cement Penetration  
Into the Bone Bed<sup>1</sup>



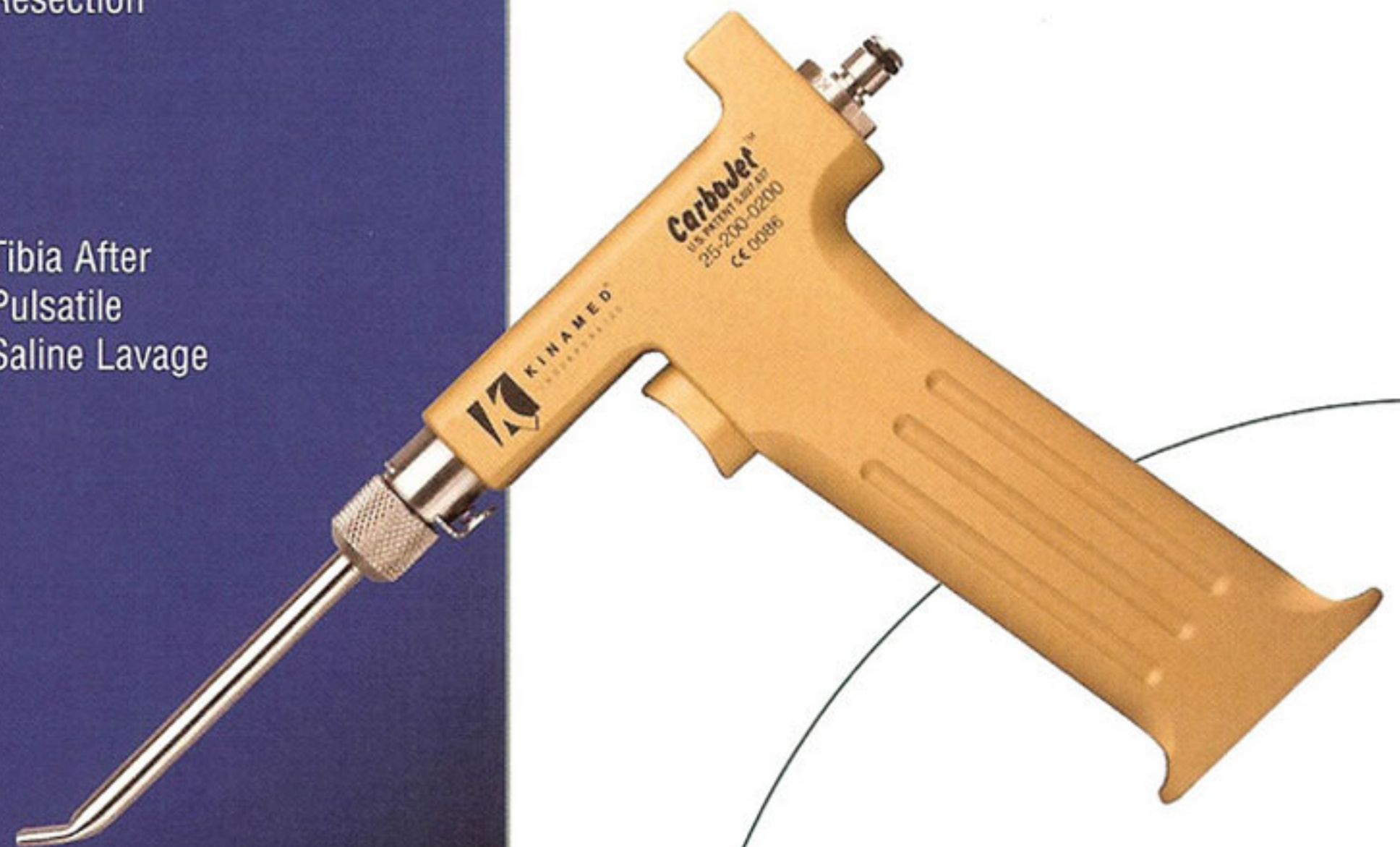
Tibia After  
Resection



Tibia After  
Pulsatile  
Saline Lavage



Same Tibia  
After CarboJet CO<sub>2</sub> Lavage



**KINAMED**  
INCORPORATED

*Expect Innovation.*



## Cleaner is Better

### Why Use CarboJet CO<sub>2</sub> Compressed Gas Lavage to Clean Bone?

Increased Cement Penetration Into the Bone Bed <sup>1</sup>

Reduced Opportunity for Micro-Emboli



*Saline lavage is effective at removing gross debris, but fluid mixing in the interstices of bone prevents thorough cleaning.*



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

A compressed CO<sub>2</sub> gas jet is more effective at removing fluid and fluid-suspended debris from a porous matrix than a liquid cleaning jet. The liquid jet is useful for "washing" of gross debris, but is much less effective at removing fluid debris in the interstices of cancellous bone.

The fluid jet works in a porous structure by incremental mixing, dilution and displacement.

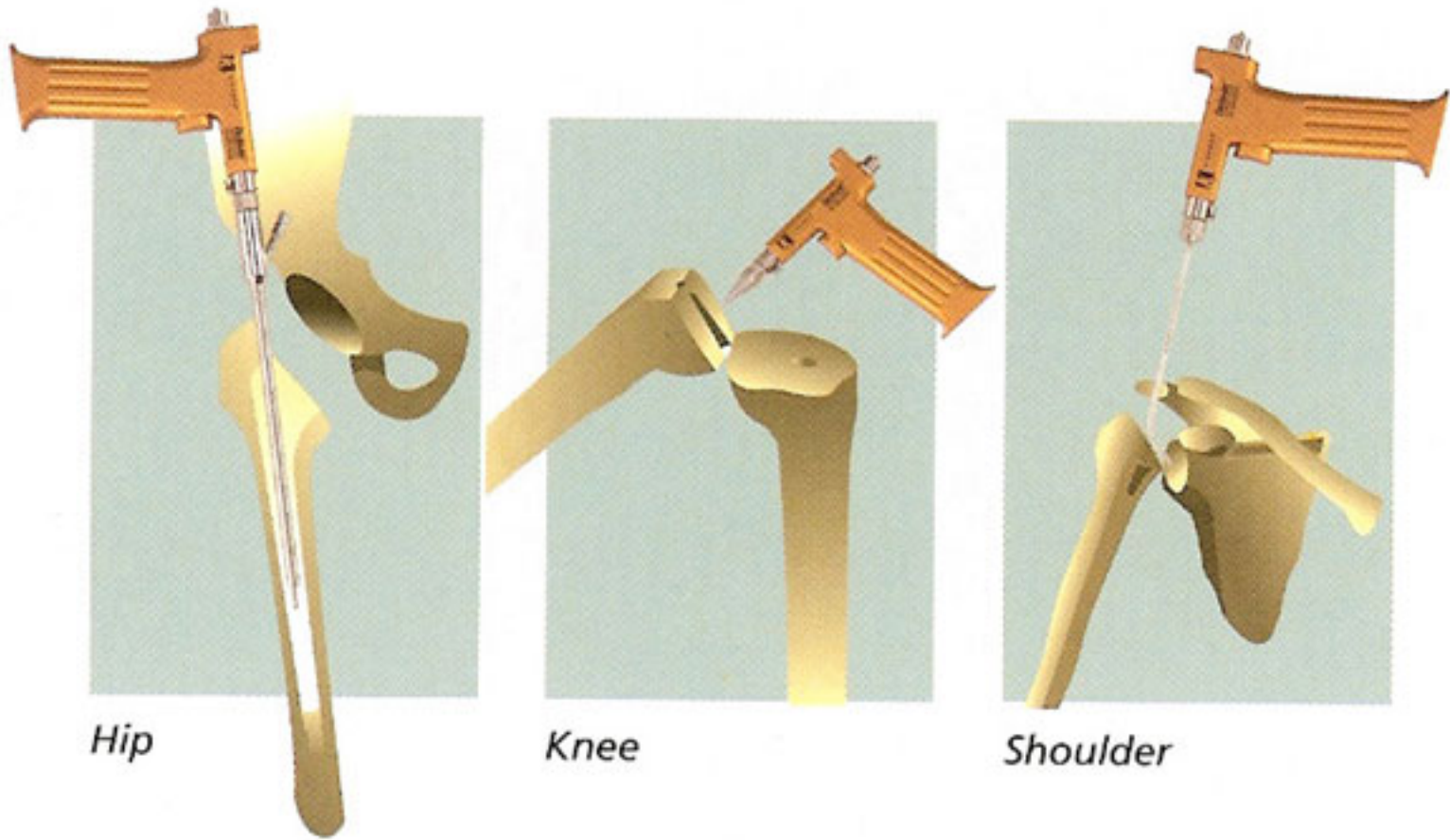
The compressed gas jet accomplishes fluid-debris removal by creating strong, fluctuating pressure gradients, displacing debris rapidly and more thoroughly.

*"CarboJet lavage 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, Orthopedic Specialists, Dallas, TX*

1. Goldstein et al (2007). Improvement of Cement Mantle Thickness With Pressurized Carbon Dioxide Lavage. 20th Ann. Meeting of the International Soc. For Technology in Arthroplasty, Paris France.





Hip

Knee

Shoulder

Indications include hip resurfacing, unicompartmental knee replacement, and any implant procedure that requires good cement bed preparation.

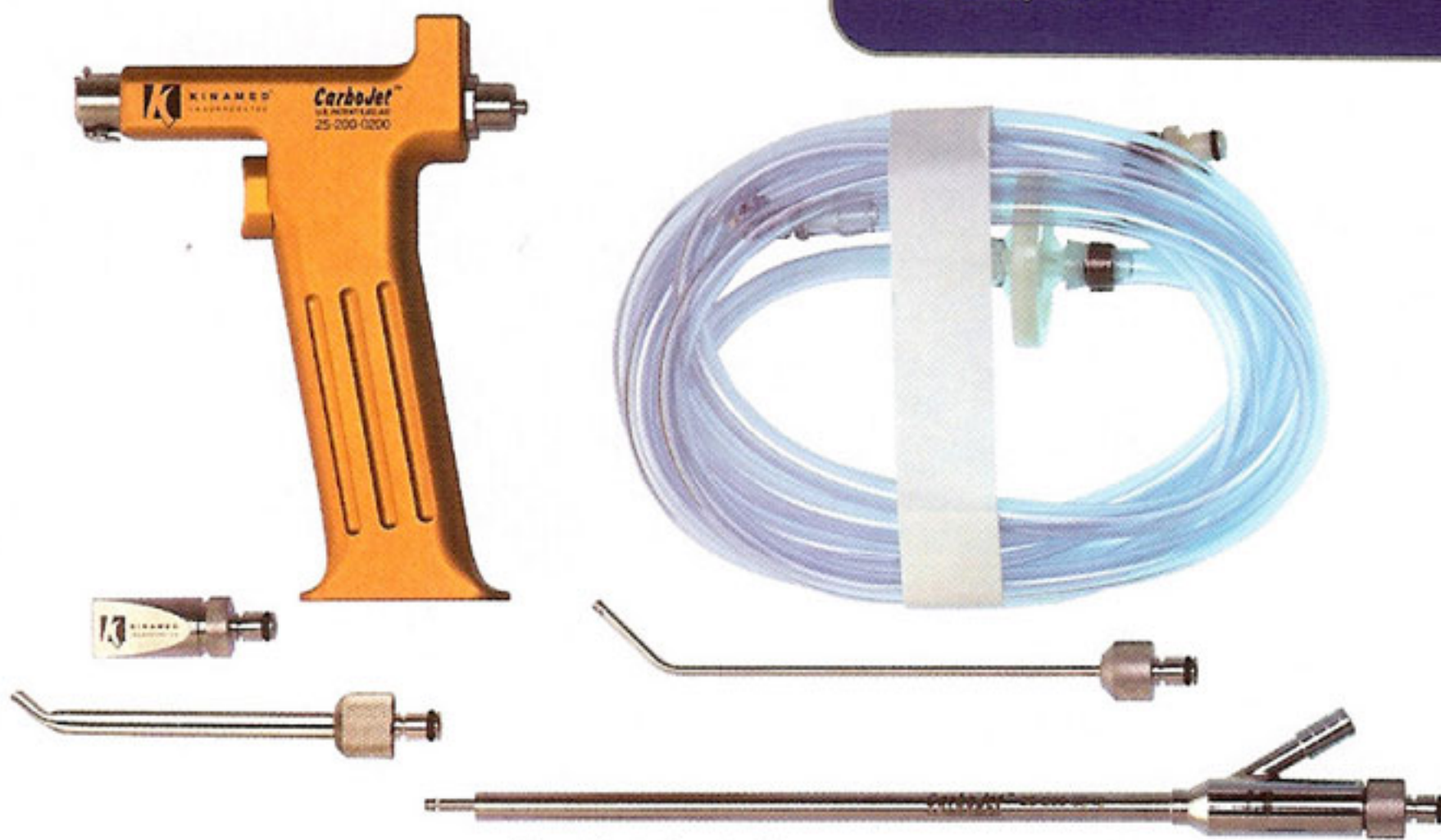
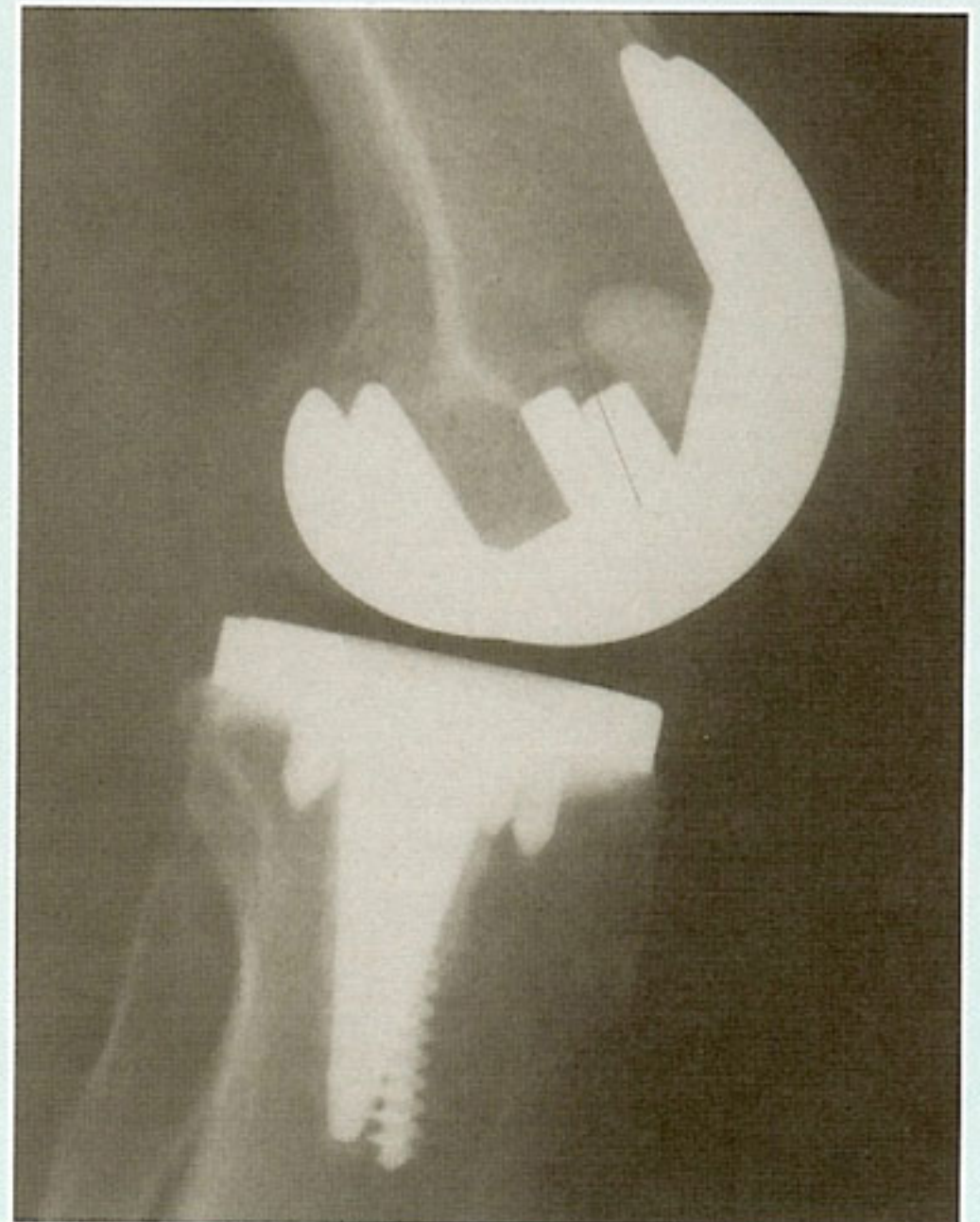
The CarboJet CO<sub>2</sub> Lavage System, in clinical use since 1993, has been used safely on tens of thousands of joint replacement patients. Compressed CO<sub>2</sub> gas has been employed as an insufflation medium in laparoscopic procedures for many years and is readily available at all hospitals.

*"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



CarboJet lavage provides the opportunity for complete "whiteout" of the cement mantle in the hip and increased cement penetration under the tibial component in the knee. (X-rays courtesy of H.M. Reynolds, Oakland, CA.)



CarboJet System

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