

**CERAMENT® G**  
with Gentamicin

CASE REPORT

Medical Education Series

# Right Knee Periprosthetic Joint Infection - 1.5 Stage Arthroplasty

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## RIGHT KNEE PERIPROSTHETIC JOINT INFECTION - 1.5 STAGE ARTHROPLASTY

### PATIENT HISTORY

53 year old male with past medical history of Type II Diabetes Mellitus, Morbid Obesity (BMI 40), COPD, obstructive sleep apnea, cerebrovascular disease, and congestive heart failure. He presented after undergoing previous total knee arthroplasty 2 years prior at outside hospital and was found to have acute hematogenous infection and underwent double debridement, antibiotics, and implant retention (DAIR) followed by 6 weeks of intravenous antibiotics (Daptomycin) and then 3 months of oral antibiotics (Bactrim) (Images 1A and 1B).<sup>1</sup> Despite this treatment approach, he continued to have persistent pain and repeat joint aspiration and laboratory workup revealed he had continued infection within the knee.

### DIAGNOSIS

Right periprosthetic joint infection in total knee arthroplasty.

### TREATMENT

In an attempt to further eradicate the infection, he underwent a 1.5 exchange arthroplasty to allow for improved mobilization, compared to the traditional use of a static spacer. Delivery of high dose antibiotics into the Epiphysis, Metaphysis, and Diaphysis (Zones 1, 2, and 3) via antibiotic-loaded PMMA (addition of 2g of Vancomycin and 2.4g Tobramycin per bag of 60g Palacos bone cement) for the Epiphysis (Zone 1) and then CERAMENT G injected into the femoral and tibial canals (Images 2A and 2B).<sup>2</sup>

### HARDWARE

- Smith and Nephew Legion Revision

### CULTURES

- MSRA, Gentamicin susceptible

### SYSTEMIC ANTIBIOTICS

- 6 weeks of Intravenous antibiotics with Daptomycin
- 3 months of oral antibiotics with Bactrim

### OUTCOME

Following 6 weeks of intravenous antibiotics and 3 months of oral antibiotics, he is now off antibiotics with normalization of his infection numbers, his functional status has improved, and the CERAMENT G has resorbed which assisted with the continued bone remodeling in the Metaphysis and Diaphysis (Zones 2 and 3) (Table I) (Images 3A and 3B).

**Table 1:**

Parameter	Preoperative	6-Month Follow-up
Range of Motion	20–70°	0–125°
C-reactive Protein	212 mg/dL	<10 mg/dL
Antibiotic Use	On therapy	Discontinued
Ambulation	Gait aid	No gait aid

## ADDITIONAL INFORMATION

Intramedullary canals represent a recognized but often untreated bacterial source in PJI. Failure to eradicate bioburden in this space may contribute to persistent infection, particularly in patients with failed prior interventions<sup>3</sup>. CERAMENT G provides sustained supratherapeutic concentrations directly at the site of infection while minimizing systemic toxicity<sup>4,5</sup>.

CERAMENT G achieves local gentamicin levels exceeding those achievable with PMMA spacers and undergoes controlled resorption, eliminating the need for later removal<sup>4,5</sup>. McNally et al. demonstrated high eradication rates using CERAMENT G in chronic osteomyelitis with excellent biocompatibility<sup>6</sup>. Stravinskas et al. confirmed sustained antibiotic elution with favorable pharmacokinetics<sup>6</sup>. The biological advantages of calcium sulfate–hydroxyapatite composites further support osseous remodeling and canal integrity especially if further revision is needed and can help to restore bone to the Metaphysis and Diaphysis (Zones 2 and 3) to avoid the potential for aseptic loosening in the future<sup>7</sup>.

This case highlights the synergy between mechanical stability of the 1.5-exchange construct and high dose delivery of gentamicin to the canals while also restoring bone quality and support in an already compromised area. In a host with multiple systemic risk factors and previous treatment failure, this combined strategy produced durable infection clearance and rapid functional recovery.



Image 1A: Pre-op images: AP following initial double DAIR.



Image 1B: Pre-op images: Lateral following initial double DAIR with continued effusion.

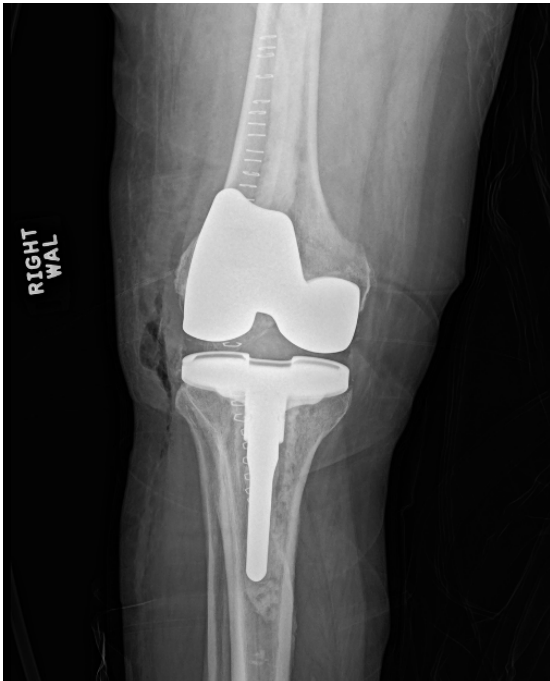


Image 2A: Initial Post-op Images: AP demonstrating CERAMENT G into the femoral and tibial canals along with 1.5 exchange arthroplasty.



Image 2B: Initial Post-op Images: Lateral demonstrating CERAMENT G into the femoral and tibial canals along with 1.5 exchange arthroplasty.



Image 3A: 3 months Post-op Images: AP demonstrating CERAMENT G resorbed in the femoral and tibia canals along with 1.5 exchange arthroplasty.



Image 3B: 3 months Post-op Images: Lateral demonstrating CERAMENT G resorbed in the femoral and tibia canals along with 1.5 exchange arthroplasty.

## Advancing Osteomyelitis Management

- Bone remodeling to promote and protect bone healing<sup>7</sup>
- Local antibiotic elution that is safe, consistent and clinically significant<sup>5</sup>



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2. Morgan-Jones R, et al. Zonal Fixation in revision total knee arthroplasty. *Bone Joint J*. 2015;97-B:147-9.
3. Naylor BH, et al. Do Antibiotic-Impregnated Intramedullary Dowels Assist in Eradicating Infection in Total Knee Arthroplasty? *Pro. J of Arthroplasty*. 2020;35:545-49.
4. Behrens JJ, Franz A, Schildberg FA, Rudowitz M, Grote S, Fröschen FS. In Vivo Antibiotic Elution and Inflammatory Response During Two-Stage Total Knee Arthroplasty Revision: A Microdialysis Pilot Study. *Antibiotics (Basel)*. 2025 Jul 24;14(8):742. doi: 10.3390/antibiotics14080742. PMID: 40867936; PMCID: PMC12382881.
5. Stravinskas M, et al. Pharmacokinetics of gentamicin eluted from a regenerating bone graft substitute: In vitro and clinical release studies. *Bone Joint J*. 2016;5:427-435.
6. McNally et al. 'Mid- to long-term results of single-stage surgery for patients with chronic osteomyelitis using a bioabsorbable gentamicin-loaded ceramic carrier' *Bone Joint J*. 2022;104-B(9):1095-1100.
7. Ferguson et al. 'Radiographic and Histological Analysis of a Synthetic Bone Graft Substitute Eluting Gentamicin in the Treatment of Chronic Osteomyelitis'. *J. Bone Joint Infect*. 2019; 4(2): 76-84.

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