

OsteoBridge[™] IKA

Knee fusion for failed total knee arthroplasty with recurring infection



Dr. Brett Levine

Dr. Brett Levine is an Orthopaedic Surgeon at Midwest Orthopaedics at Rush who is a recognized expert in complex primary and revision hip and knee reconstructions. Dr. Levine is a member of the Hip Society, Knee Society, AAHKS, AAOS, AOA and MAOA, holding multiple committee positions amongst these organizations.

He trained at the NYU Hospital for Joint Disease and completed his Adult Reconstructive Fellowship at Rush University Medical Center. He currently sits on the editorial boards of multiple medical journals and is the Deputy Editor of Arthroplasty Today. He is a leader in arthroplasty research and has over 190 publications in peer-reviewed journals. He currently serves as a Professor at Rush University Medical Center and lectures internationally.

Case Information

Age:	52
Sex:	Male
BMI:	65.64
Diagnosis:	Failed total knee arthroplasty with recurring infection
Joint:	Knee



12/13/2013



09/01/2016

Patient History

A 52-year-old severely obese male presented with a history of multiple failed knee surgeries beginning with a total knee replacement due to right knee osteoarthritis and subsequent revisions due to persistent infection. The total knee replacement had been complicated by recurrent infections requiring two-stage exchanges resulting in upwards of 10 surgeries. **Figure 1** shows a timeline of the different surgical interventions for this patient's knee. The patient also had wound dehiscence complications which required a rotational flap by plastic surgery. After multiple unsuccessful spacer exchanges and antibiotic regimens by infectious disease to eradicate the infection over the course of three years, the patient was considered for arthrodesis. Prior to the knee arthrodesis, the patient experienced increased pain, high ESR, high CRP, and WBC count necessitating an additional spacer exchange. At this time, high pain scores prevented ambulation without assistance. Successful antibiotic treatment and weight loss normalized the patient's labs, and a knee arthrodesis was performed using the Merete[®] OsteoBridge[™] Intramedullary Knee Arthrodesis (IKA) System.

Management/Surgical Summary:

Prior to the surgery, the patient lost approximately 22 kg (241 kg to 219 kg) to be cleared to have surgery. The plastic surgeon provided the exposure to the cement spacer, and this was removed without complication.

Next, cultures of the medullary canals of the femur, tibia, joint space and portions of the capsule were sent to the pathology lab. Subsequently, the synovial WBC count and cultures came back indicating no infection, and the frozen section was equivocal. Therefore, the surgical plan for knee arthrodesis moved forward. After a thorough irrigation and debridement as well as a dilute Betadine soak, the canals were reamed and appropriately sized to fit 20 mm x 300 mm bowed tapered nails for both the femur and the tibia. Trial nails were reamed to fit and a trial spacer was inserted to confirm positioning and fit under fluoroscopic imaging.

Before inserting tibial and femoral nail implants, the patient was irrigated with saline then soaked with a second dilute Betadine and peroxide combination. The patient was re-irrigated with saline and a final debridement was performed prior to implantation. Next, the tibial and femoral nails were locked in place with transfixion screws under fluoroscopic imaging using the perfect circle technique to obtain bicortical purchase of the four interlocking screws. The nails were then clamped together by the Merete® IKA spacer to bridge the joint space. Due to the size of the patient, Rush rods were placed up and down the medullary canal of the femur and the tibia to provide additional support. Bone wax was placed in the screw heads, and bone cement mixed with 3 g of vancomycin and 1.2 g of tobramycin per batch was wrapped around the implant spacer and around the femoral and tibial nails in the metaphyseal space to provide better stability, local antibiotic delivery, and improved load distribution of the arthrodesis construct. At this point in time, the wound was irrigated with pulsatile lavage after implant placement was confirmed under fluoroscopy. Plastic surgery closed the wound over a drain after reapproximating the muscle rotational flap and skin/soft tissue advancement flap.



12/13/2013

Implants used:

Merete® OsteoBridge™ Intramedullary Knee Arthrodesis (IKA) System

- Femur: 20 mm x 300 mm Bowed Nail
- Tibia: 20 mm x 300 mm Bowed Nail
- IKA Spacer: Fixed 10-degree angle, a standard length of 50 mm and diameter of 40 mm
- 4 Interlocking/Transfixion Screws

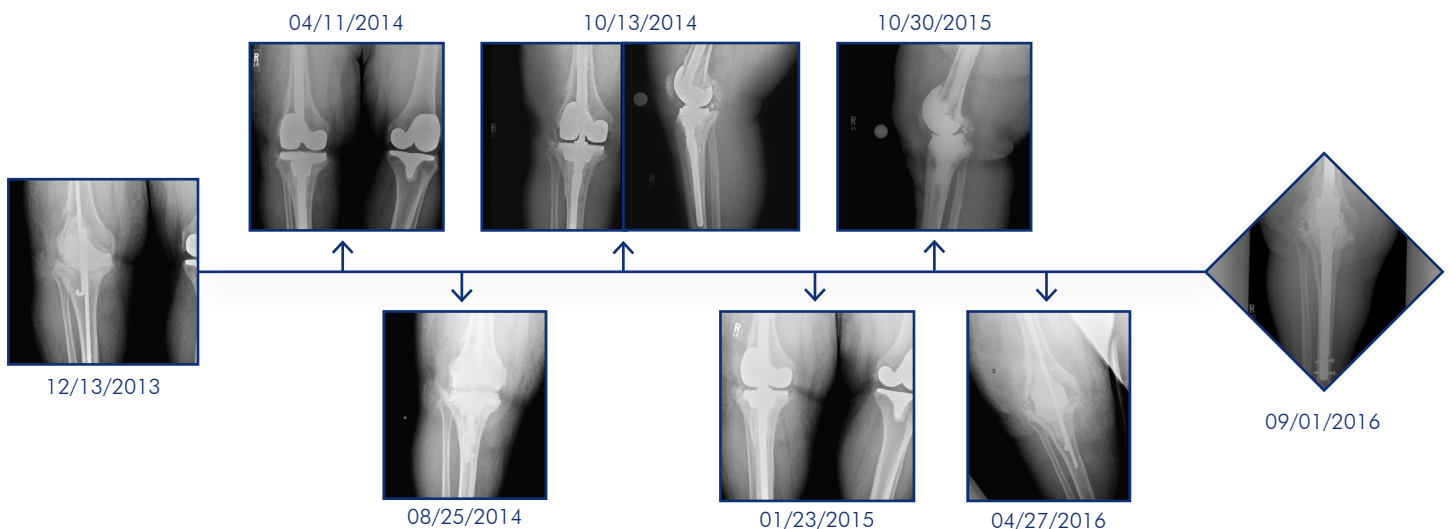


Figure 1: Timeline of surgical interventions leading up to knee arthrodesis

Patient Outcome:

The patient was discharged from the hospital on their second post-operative day with no complications and a course of intravenous antibiotics along with a plan for chronic suppression. At the 2-month follow-up, the patient had no drainage or erythema at the wound site and only slight pain with straight-leg raising but otherwise was doing well. By the patient's 4 month follow-up, he was able to ambulate without assistance and fully weight bear on both extremities. The patient reported at this time that they were able to go back to the gym with significantly decreased levels of pain. The patient exemplified 5/5 strength in their ankle with dorsiflexion, plantar flexion, and great toe dorsiflexion. The patient's sensation was intact to light touch diffusely throughout and had 2+ posterior tibial and dorsalis pedis pulse.

Five year post-operatively, the patient reported to have intermittent drainage from the knee which was controlled by infectious disease management with a chronic suppression antibiotic plan. The patient had been functioning well and was still able to ambulate and work. The subsequent physical exam showed intact motor and sensory function with good strength of the affected limb.

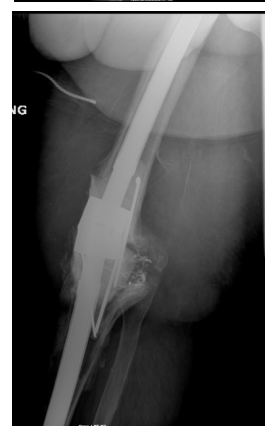
Summary/Conclusion

Why Merete® OsteoBridge™ IKA Knee Arthrodesis System was Chosen?

The Merete® OsteoBridge™ IKA System was the best option to treat this patient's recurrent periprosthetic right knee infection because it satisfied the four following conditions:

1. This was the patient's second failed 2-stage exchange procedure and to treat the infection it is routine in my practice to utilize a static construct when treating refractory infections.
2. The patient required a medial gastrocnemius rotational flap to cover the inferior medial wound defect over the knee. Routinely, we utilize a rigid static spacer to provide the flap with the most stable environment for healing.^{1,2}
3. Utilizing alternative forms of a static spacer such as various types of intramedullary nails, smooth or threaded pins and/or just polymethylmethacrylate would not provide sufficient stability without requiring a brace as an adjunct. With the wound care concerns, this would be suboptimal, and a more rigid spacer was deemed favorable.³
4. The patient's weight fluctuated around the 500-pound level (BMI >60kg/m²) making it more difficult to control the knee with smaller devices as well as external aids such as a brace, splint, or cast.⁴

In this case, the patient's range of motion was poor and the functionality of the extensor mechanism was suboptimal.⁵ Therefore, the definitive options for management included arthrodesis or amputation. Due to the patient's overall size, amputation was deemed a non-viable option for the patient⁶, and they elected to move forward with an arthrodesis. The largest bowed nails were required to fill the medullary canals and these were coated with antibiotic cement in the metaphyseal region and locked with transfixion screws. This combination gave excellent fixation, preserved the limb length, and allowed for volume reduction and better coverage with the rotational flap. The patient was able to early weight bear and return to work as a gym teacher. The patient has battled recurrent symptoms of infection but is now approximately seven years out from the successful insertion of the Merete® OsteoBridge™ IKA System.



09/01/2016

Case study worked on in conjunction with Joyee Tseng, BS/MS, Clinical Research Fellow

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