St. Charles Hospital Orthopedic Specialists
Invent and Refine Surgical Techniques

By: Jennifer Webster
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It’s one thing to practice advanced surgery. But St. Charles Hospital takes its game to the next level, developing surgical innovations to go the extra step in caring for patients.

Thomas Swanson was dying. The 65-year-old man had an unusual infection, one that, in a rare twist of fate, had attacked both his native hips.

“When I first saw him, the man was in extremis,” recalls Nakul Karkare, MD, joint replacement surgeon at St. Charles Hospital. “He was in septicaemia due to bilateral hip infection resulting from a hematogenous infection from an unknown source. His fever was spiking. He looked up at me and asked, ‘Doctor, will I live?’

“This was not the time to get philosophical. The patient was very ill and needed support. I told him, ‘You will be fine.’”

A Series of Improvised ‘Firsts’

Nakul Karkare, MD, orthopedic surgeon, St. Charles Hospital, speaks with a patient moments before orthopedic surgery.
Dr. Karkare knew he would need to perform more than one unprecedented surgery, as Swanson needed to have both infected hips removed and replaced — for the time being with antibiotic-laden spacers. He had a double strike against him, Dr. Karkare says, because he was suffering simultaneously from the severe infection and arthritis.

In most cases, infections occur in replaced joints rather than native joints. In these instances, spacers may be introduced following removal of the previous implant and debridement. Many patients go on to subsequent planned revision surgery with excellent results. The procedure is unusual for native joints and very rare indeed on an emergent basis.

“I had to go in emergently and subsequently perform a staged reconstruction on both hips,” Dr. Karkare says. “First, we took out the infected joint and replaced it with articulating spacers made of antibiotic cement.”

**Nakul Karkare, MD**

Fellowship-trained in joint replacement surgery, orthopedic trauma and metabolic bone disorders, Nakul Karkare, MD, joint replacement surgeon at St. Charles Hospital, draws on his extensive training to customize treatments. Dr. Karkare also holds a Master of Science in biomedical materials engineering from SUNY Alfred.

- Medical school: Amravati University, India
- Fellowships: Hospital for Special Surgery (arthroplasty and metabolic bone disease); York Hospital (trauma); R. Adams Cowley Shock Trauma Center (orthopedic trauma)

Using a mold he made in the operating room to fit the patient’s hip socket, Dr. Karkare created spacers using bone cement mixed with approximately 10 grams each of tobramycin and vancomycin. These dosage levels of antibiotics would be deadly if administered intravenously, but as part of a local implant, they effectively kill bacteria in a safe manner.

Intended as temporary joint replacements, spacers come in two forms: articulating and static. Articulating spacers allow the joint some movement, while static spacers do not.

“With articulating spacers, the patient was able to get around with a walker,” Dr. Karkare says. “These spacers offer a limited range of motion and are intended for temporary use. Postoperatively, the patient’s condition improved significantly, and his fever resolved.”

Additionally, Swanson received a course of intravenous antibiotics for several weeks. After that, he underwent additional surgeries to receive his new hips.

“We had to replace his hips one at a time because of his illness and general condition,” Dr. Karkare says. “We performed revision anterior hip replacement surgery on his left, then on his right. We ensured the infection was completely gone by aspirating his hips before removing the spacer. I then inserted a revision prosthesis, which is a little larger than an initial hip joint prosthesis.”

Today, Dr. Karkare concludes warmly, Swanson is living independently in his own home without the need for antibiotics or pain medication. Dr. Karkare knows of no other patient in the country who has undergone minimally invasive, bilateral anterior hip spacer insertion followed by bilateral anterior hip revision surgery.
Destination for Progress

St. Charles Hospital encourages its physicians to innovate. That’s good news not just for a single patient receiving a first-ever surgery or an individual physician publishing in a prestigious journal. Rather, a culture of collaborative innovation raises the quality of care for all patients.

“I’ve been with St. Charles since 1998,” says Brian McGinley, MD, an attending orthopedic surgeon at St. Charles Hospital who holds a patent in technology for computer-assisted knee replacement. “The leadership has been instrumental in allowing me to partner with companies and experiment with different technologies. Healthcare technology companies come here to observe and learn from us. The collaborative relationship helps us push the envelope in orthopedic surgery.”

“I have a patient in her 60s whose hip and knee I replaced; I have a picture of her windsurfing in Hawaii — 15 or 20 feet in the air off a wave. She was proud, but she can’t know how proud I was.”
— Brian McGinley, MD, attending orthopedic surgeon at St. Charles Hospital

Brian McGinley, MD

Brian McGinley, MD, attending orthopedic surgeon at St. Charles Hospital, became interested in his field at a young age. At 15, he suffered a sports injury and underwent knee surgery — the first of five such surgeries over the years.

“I became interested in orthopedics during my initial rehabilitation,” he says. “I took to it, and I’ve stayed with it.”

- Medical school: Columbia University
- Residency: St. Luke’s-Roosevelt Hospital Center
- Fellowship: Insall Scott Kelly Institute for Orthopaedics and Sports Medicine

The first program in New York to routinely use computerized joint replacement techniques, St. Charles maintains a progressive philosophy toward using technology in orthopedic surgery. Working with operative technology not only helps physicians perform surgeries in an accurate, often minimally invasive fashion, it can lead to enhanced insights about the exact alignment and balancing of a joint, as well. And having a clear understanding of how surgical software is developed helps a physician maximize its use.
“Part of joint replacement surgery is cutting into bones, placing new caps and so on,” Dr. McGinley says. “Our computer navigation system helps us do that. But equally important is knowing the anatomy — how tight to make ligaments, how to ensure full flexion and extension of a joint, how far the knee cap can roll in its groove. That is where knowledge of both the anatomy of the joint and knowledge of the software comes in.”

**What’s New in Knee Replacement?**

Today, Dr. McGinley is most interested in the ongoing developments in robotic and computer-assisted surgery. St. Charles Hospital offers computer-guided surgery for total hip and knee replacement. This technology aids surgeons in preoperative planning as well as intraoperative accuracy and safety.

In an ongoing effort to expand the array of advanced orthopedic surgical technology, the hospital is currently investigating a robotic, unicompartmental knee replacement system. This system will bring the advantages of robotic surgery to a wider variety of knee replacement candidates — patients who are younger, have limited arthritis or who have suffered an injury such as a torn meniscus at a young age, resulting in arthritis later in life.

A total hip replacement utilizing the anterior approach method requires specialized retractors and does not require muscle cuts.

“With robotic surgery, we can perform unicompartmental implantation with excellent precision to restore function with less pain and more natural motion,” Dr. McGinley says. “In the past, total knee replacement drew on instrumentation that was well thought out, while partial knee replacement instrumentation was difficult to make and use. Unicompartmental knee replacement is complicated because the surgeon only opens half the knee; this makes it tricky to get the alignment right on target. With robotic surgery, the cuts on the thigh and lower leg bone are determined before surgery, based on an MRI or CAT scan. When performing the bone cuts, the robotic reamer will shut off if the surgeon deviates from the prearranged plan. Cuts will be perfect.”

As well as providing additional simplicity and reliability for surgeons, robotic unicompartmental knee replacement offers multiple benefits to patients:

- Precision cutting allows for reliably exact placement of implants.
- The robotic arm permits surgery to be performed through small incisions, resulting in less trauma to surrounding muscles and ligaments, smaller scars, and faster recovery.

**Advancing Hip Arthroplasty — the Anterior Hip Replacement**
When it comes to hip surgery, the anterior technique offered at St. Charles offers multiple advantages over traditional surgery. No muscles are cut in anterior hip replacement surgery, resulting in increased functional stability. Since one of the postoperative complications of hip replacement involves dislocation of the joint, stability is particularly important to improving outcomes of this surgery.

“With an anterior approach, the patient can squat to the floor on the same day as surgery without risking dislocation,” Dr. Karkare says. “This is something that has impressed me a lot; patients who undergo anterior hip replacement stand and walk the same day as surgery and often return home on the second postoperative day. Additionally, patients face no restrictions in terms of crossing their legs, sitting in low chairs or bending their legs beyond 90 degrees.”

Anterior hip replacement surgery at St. Charles Hospital uses the same implants as traditional surgery, but relies on different instrumentation, such as specialized retractors.

“Most surgeons in the United States use a specialized table for anterior hip replacement,” Dr. Karkare says. “I employ a different method utilizing a regular table. I drape both legs and adduct the afflicted extremity for the femoral approach beneath the other leg. By draping both legs and utilizing a figure ‘4’ position, I can obtain an excellent view of the femur.

“Surgeons typically utilize intraoperative imaging to visualize placement of the acetabular and femoral components and compare leg lengths,” he explains. “Because I drape both legs
and don’t use a specialized table, I can make a direct visual comparison, without the additional use of intraoperative fluoroscopy. I simply place the legs next to each other and measure them before closing.”

As well as providing improved outcomes for patients, Dr. Karkare’s approach to anterior hip replacement has advantages for the surgeon and medical center. This surgery only requires one assistant to the surgeon, he says, resulting in cost-savings beyond that of not purchasing unnecessary surgical equipment.

Most patients who need hip replacement surgery can be considered for anterior approach arthroplasty. The few exceptions include those who have had prior surgery using posterior approach and patients who require removal of prostheses that cannot be accessed through an anterior approach. Also, patients with long-standing dislocations may not benefit from this approach to hip replacement surgery.

All-Around Care, Here at Home

The skill and innovation among surgeons at St. Charles Hospital may conjure the image of wizards, but patients are at the center of the process. Before and after joint replacement surgery at St. Charles Hospital, patients receive everything they need to derive maximum benefits from their surgery.

Before surgery, patients meet a clinical nurse educator who serves as a navigator through presurgical testing, surgery and recovery. Patients attend a joint replacement class, which covers pre- and postoperative processes and provides valuable instruction about how to make joint replacement a success.

Following surgery, patients are encouraged to stand and walk very soon — on the same day of surgery, if possible. St. Charles Rehabilitation’s skilled physical therapists work with patients in the hospital and on an outpatient basis at any of St. Charles’ outpatient centers: Centereach, East Setauket, Melville, Patchogue, Port Jefferson, Ronkonkoma, Smithtown or Albertson.

Decreasing Complications Related to Blood Clots

Medical approaches to limit deep vein thrombosis (DVT) also contribute to patient safety. When possible, Dr. Karkare prefers to avoid powerful anticoagulant drugs, which can cause bleeding inside the joint that has been operated upon or elsewhere in the body. Instead, he uses only aspirin for DVT prophylaxis.

Dr. McGinley examines his patient following a total knee replacement.
“Less tissue trauma during surgery, regional anesthesia, stockings with sequential compression devices postoperatively, and especially getting the patient to stand and walk as soon as possible — ideally the same day of surgery — these approaches eliminate the need for potent anticoagulants,” Dr. Karkare says. “Additionally, with aspirin, there is less risk for heterotrophic ossification inside the joint, which can hinder range of motion. Aspirin also provides excellent, inexpensive pain relief. Patients are thrilled because this approach to DVT results in no needle sticks postoperatively to measure INR [international normalized ratio].”

**For Surgery or Conservative Care, a Wise Call**

Referring physicians constitute an important part of St. Charles Hospital’s orthopedics team. When is it time to refer a patient who complains of knee or hip pain for evaluation by a specialist?

“Most people experience knee pain at some time in their lives,” Dr. McGinley says. “When pain just comes and goes, primary care providers should encourage patients to ice the joint, use ibuprofen and take other home measures. But when pain does not improve, an orthopedic specialist will be happy to evaluate the patient.”

Most people who experience joint pain do not require surgery, even when their cases merit orthopedic intervention. Like other orthopedic physicians at St. Charles Hospital, Dr. McGinley and Dr. Karkare offer a host of nonsurgical solutions to joint pain. For instance, Dr. Karkare works to ameliorate or reverse the effects of osteoporosis and osteoarthritis in his patients.

Dr. McGinley also prefers conservative management of joint pain and joint injuries when possible.

“Most of my patients do not need surgery,” he says. “I can treat their complaints with injections, physical therapy, creams and medications. For those with specific complaints that do require surgery, we have options now, such as unicompartamental joint replacement, which offer reproducible, excellent results.”

**The Treatment of Osteoporosis in Orthopedics**

St. Charles Hospital’s new electronic medical records system allows multiple users to access patient charts at the same time; nurses can document vital signs and medication distribution while physicians review charts prior to patient consults.

Many patients who undergo joint replacement surgery have underlying osteoporosis, Dr. Karkare says, and he prefers to treat the condition before it becomes severe. For instance,
when a patient suffers a hip fracture and then receives treatment for osteoporosis, his or her risk of subsequent fractures drops by as much as 30 percent. Even for patients who undergo joint replacement, Dr. Karkare says, it is still important to follow up with ongoing treatment of underlying bone loss, especially to prevent fractures around the artificial joints.

“As a specialist in metabolic disorders of the bone, I focus on the treatment of underlying bone biology,” he says. “Biological treatments that can improve patient quality of life and even extend longevity are often available.”