St. Charles Hospital
Adds MAKOplasty to Osteoarthritis Treatment Armory
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“One of the causes is the mechanical breakdown of cartilage due to injury or to overall knee alignment,” Dr. Petraco says. “When a patient has a problem with alignment or previous injury, such as a torn meniscus, he or she is more susceptible to developing arthritis in the knee.”

Patients who are elderly, obese or have a family history of arthritis are also more likely to develop the condition. Those with imperfect joint alignment, such as that associated with genu valgum or genu varum, may experience it as well.

Cartilage breakdown results in rough surfaces where bones meet. Bone may even rub against bone, making movement of the joint difficult and painful. Bits of broken cartilage may irritate the synovium, and the joint may become inflamed, changing shape over time. Osteophytes may develop.

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St. Charles Hospital Adds MAKOplasty to Osteoarthritis Treatment Armory

By Jennifer Webster

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Treatments for Osteoarthritis of the Knee

Numerous treatments benefit patients who have osteoarthritis. At St. Charles Hospital, physicians conservatively manage the condition, relying on injections and oral medications as long as they work well for patients. Weight loss can also greatly reduce the chance of osteoarthritis becoming worse.

“We treat most patients with anti-inflammatory medications, such as ibuprofen or naproxen,” Dr. Petraco says. “When those are no longer effective, our next step is injectables, either cortisone or viscosupplements, which are synthetic forms of the lubricants the joint naturally produces.”

Medical treatments and lifestyle adjustments may remain effective for many months or years. Nevertheless, some patients will eventually need surgery for their condition. Knee replacement surgery options include total knee replacement and partial knee resurfacing, both of which are performed with excellent results at St. Charles Hospital.

“When conservative measures are no longer effective and patients’ lifestyles are being dramatically altered because of discomfort, we begin to assess surgical options,” Dr. Petraco says. “If the arthritis is confined to only one of the three components of the knee, a partial replacement is often the best choice.”

In addition to those whose arthritis is limited to a single knee compartment, patients who would benefit from MAKOplasty partial knee resurfacing include those who have middle-stage arthritis. Relatively young patients make good candidates and are turning to this option in increasing numbers, Dr. Petraco says.

“People in their 50s or even 40s often present with only one compartment of their knee affected by arthritis,” he says. “We can help these patients return to normal function, and they will be able to do things they could never accomplish with a total knee replacement. Then, many years down the road, when they need a procedure to convert their partial knee resurfacing to a total knee replacement, it is like a first replacement for them.”

Those with congenital alignment problems, such as genu varum or genu valgum, may also benefit from partial knee resurfacing, according to Brian McGinley, MD, orthopedic surgeon at St. Charles Hospital.

“Patients who are knock-kneed or bowlegged may experience joint wear and...
A Different Kind of Robot

Since MAKOplasty is a robotic surgery, patients may associate it with da Vinci procedures. However, MAKOplasty has many features that set it apart. The relationship between the robot and the surgeon-operator is different. In the case of a robotic prostatectomy, for example, the surgeon is working at a console, not manipulating the instruments by hand.

“With MAKOplasty, the surgeon removes bone using something similar to a high-speed drill,” Dr. Petraco says. “The robotic component is actually a safety and precision measure. At any given time during surgery, an overhead camera looks at arrays attached to the bone. The camera and robot communicate so the robot knows where the burr is relative to the bone at all times. If the surgeon tries to remove bone from an area that wasn’t indicated for removal in the preoperative plan, the burr turns off. And, if you try to push the burr outside the field of intended bone resection, the burr will not move.”

The result, Dr. McGinley says, is unprecedented accuracy.

“I know that my surgical plan will be replicated to within 1-millimeter accuracy,” he says. “The end result will be an aligned prosthesis that will not wear out.”

The emphasis on pinpoint precision begins with the initial CT scan.

“We download the information from the CT into the computer, which constructs a graphic design of the femur and tibia surfaces,” Dr. McGinley says. “With that information, we determine the size of the component we need to use and how to position it for the best alignment and stability. While we perform surgery, the computer helps us place the prosthesis correctly, assesses stability and checks the tightness of the ligaments. That way, we can position the prosthesis and adjust the ligaments as necessary during the course of the procedure.”

Devices on the femur and tibia make this tracking possible. Infrared cameras beam light to the tracking markers and report the information instantaneously to the computer, which matches the tracking data to the CT scan used to identify the location of the bone surfaces.

“We start by touching the bone surfaces with a tracking probe, which shows the computer where the surface is relative to the bone,” Dr. McGinley explains. “Then, the computer knows how the bones match the surface map we have created, based on the CT scan data. If we do not pick our reference points well enough, the computer alerts us, and we make adjustments. As we perform surgery, the burr recognizes the location of the bones and bone surfaces and, as a result, its own location.”

Dr. McGinley has been performing partial knee resurfacing for many years, he says, and he appreciates the extra
feedback and assurance provided by the robot.

“I have increased confidence in the positioning of the component,” he says. “After a procedure is complete, I am comfortable that I have matched the plan well. Also, I can check my work after surgery with the surface mapping technique and see that the stability and alignment are correct, giving me assurance that the prosthesis will not wear unevenly.”

**Comparisons to Total Knee Replacement**

Just as the indications for partial knee resurfacing differ from those for total knee replacement, the procedures are quite different. At St. Charles Hospital, both give patients highly satisfactory outcomes.

Patients who are candidates for total knee replacement primarily include those with osteoarthritis in all three compartments of the knee. Patients having revisions of previous knee surgeries should also undergo total knee replacement. According to MAKO Surgical, only about 30 percent of people with osteoarthritis of the knee are candidates for MAKOplasty.

However, MAKOplasty offers many advantages over total knee replacement. Hospital stays and recovery times are shorter with MAKOplasty. In fact, people typically return to work two to three weeks after MAKOplasty, compared to six to 12 weeks after total knee replacement. Also, risk of surgical complications is lower, and patients experience less postoperative pain.

“With total knee replacement, it takes a while for patients to experience pain relief,” Dr. McGinley says. “However, with MAKOplasty, patients feel better almost immediately because we can get rid of the grinding surfaces of the bone with only a small procedure.”

Incisions are smaller than for total knee replacement, Dr. Petraco says. Even better, a partial knee resurfacing has the same “feel” as the original joint, he adds.

“One of the best aspects of partial knee resurfacing, according to patients, is that...
the replacement feels like their own knee,” he says. “With total knee replacement, even though patients are quite happy with the results, they can tell it is a new knee. The movements do not fully mimic those of a normal knee. However, in a partial knee resurfacing, the patient retains the cruciate ligaments, so stability isn’t affected.”

MAKOplasty patients can perform almost any physical activity they could before surgery; often, they can add activities to their repertoire. With both total and partial knee surgeries, most patients can hike, golf and swim after surgery. Typically, partial knee resurfacing patients can also return to more rigorous athletic activities — although, Dr. McGinley warns, the more friction the prosthesis endures, the sooner it will wear out.

As with any surgery, MAKOplasty also comes with risks, including blood clots, infections, the need for transfusion and the possibility of future revision surgery, Dr. Petraco says. However, MAKOplasty minimizes these risks, compared with traditional knee replacement.

“The risk of transfusion is close to zero because we work through a small incision,” he says.

Also, not every patient with osteoarthritis in a single knee compartment benefits from this surgery.

“This surgery will not correct an excessive deformity, such as extreme knock-knee or bowed legs,” Dr. McGinley says.

The Patient Experience

After partial knee resurfacing, patients typically spend only one night in the hospital. Their posthospital recovery also proceeds quickly. They can typically walk without assistance the morning after surgery and require only about six weeks of physical therapy.

“We see patients two and six weeks postoperatively, and then we turn them loose until their annual physical,” Dr. Petraco says. “Often, younger patients only need about two weeks of the longer physical therapy plan we recommend for them.”

MAKOplasty has been around for about five years, so the implant’s longevity has not been demonstrated across large numbers of people. However, Dr. Petraco says, all indications suggest it has excellent staying power.

“Other partial knee replacements typically had about a 10 percent rate of revision at 10 years out,” he says. “At 15 years out, 80 percent were doing well. However, based on early MAKOplasty data, we expect this form of partial knee resurfacing will perform much better. I would estimate more than 90 percent of implants will last 15 years or more.”

“At St. Charles Hospital, we have not had any revision surgeries following MAKOplasty,” Dr. McGinley says. “Nationwide, studies show excellent results for partial knee replacement using the MAKO system. In fact, partial knee replacements prior to MAKOplasty had about the same longevity as total knee replacement, so we expect these implants to do extremely well in comparison, given the accuracy of the placement.”

Longevity is also a function of patient selection, Dr. McGinley says. At St. Charles Hospital, physicians guide patients carefully. Patients likely to experience osteoarthritis in all three knee compartments at some point in the future are guided to conservative management or total replacement, even if they are temporarily candidates for MAKOplasty.

“Referring physicians should be aware that MAKOplasty is a verified, researched option that can help patients return to a more active lifestyle than they could with total knee replacement,” Dr. McGinley says. “I would undergo this operation with no hesitation if I were a candidate, and I would recommend it to my family members.”

To learn more about how St. Charles Hospital can benefit your patients, visit stcharleshospital.chsli.org.