

Knee replacement technology cuts healing time

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The first robotic arm system for orthopedic surgery is making things easier for patients who have to undergo unicompartmental or partial knee procedures.

It also gives surgeons the upper hand in the operating room.



Dr. Lawrence D. Dorr shows his patient, Rancho Palos Verdes resident Margaret Lee, an X-ray of her two knee surgeries. The most recent surgery, on her right knee, used the new robotic arm technology that helps make the procedure more precise.

Rancho Palos Verdes resident Margaret Lee is one of about only 15 patients in the Los Angeles area to have the robotic arm used during surgery. Lee, who suffered from osteoarthritis in her right knee, had a partial replacement on Oct. 22. Osteoarthritis is a type of arthritis that is caused by the breakdown of cartilage between the bones. Twelve years ago, the 64-year-old had a total left knee replacement by Dr. Lawrence Dorr, who pioneered this procedure along with a team of doctors. Dorr is the medical director of the Arthritis Institute at

Good Samaritan Hospital in Los Angeles.

“What’s going on right now and what the frontier is in orthopedic surgery is precision surgery. It’s putting in the implants and the different devices in the most precise position possible, and that requires machines in the operating room,” Dorr said.

To make the replacements last longer for a patients, surgeons need that exact location every time, he added. Less than 10 years ago with the introduction of computer navigation, similar to a Global Positioning System in a car, orthopedic surgery improved greatly. The navigation device tells doctors exactly what position the bone is in so that the implants are precisely placed. “That still required manual use of tools by the surgeon, which could vary the position a little bit from what you really wanted,” Dorr said. “So to make the implant go in exactly right every time, we actually [have] taken it up one step and now we’re using robotic arm, [which] does the bone preparation for the implantation of the device.” Preparing the bone entails resurfacing the bone so that a metal (and plastic) implant can be placed on the bone, which substitutes as cartilage. It’s still up to the surgeon to make the plan for the location of the device using software for the robot. “But the robot doesn’t allow the surgeon to make an error — it takes out the human error. Because with the robot, when you’re preparing a bone, whether it’s in the knee ... or whether its in the hip, if you go beyond where you’re supposed to be in preparing the bone, the robot stops. It won’t let you make a bad cut in the bone.” The robot allows for more precise unicompartmental replacements, which in the past was a free-hand operation that left room for mistakes. “You still had to eyeball getting it in right,” Dorr said. “With manual instruments the survivorship of a unicompartmental replacement has been 85 to 90 percent [for] 10 years. What we should be able to do with the robot is take that final 15 percent and give it a 99-percent survivorship of 10 to 20 years — that’s what our goal is here.” In comparing her surgeries, Lee said the recovery time was the biggest difference. “When they did the total knee it was quite lengthy and a lot more painful. Quite painful by comparison,” she said. “[With the first surgery] I wasn’t able to drive for maybe a month or so. With this one I’m having a therapist come in twice a week, and he does basic exercises with me. I was able to drive within a two-week period.” The incision made for the operation also is significantly smaller, Lee added. “This machine gives precision

in the amount of disease material that will be shaved away ... It's more exact," she said. "So on the inside of my knee, the medial side, where the cartilage was degenerated, they were able to shave off those areas. "With the other procedure they shaved off the total knee top and bottom. I watched the video, and they actually cut it off and then they hammered the prosthesis in through the bone," she added. Lee was a candidate for this type of procedure using the robotic arm because the pain she was experiencing was in one spot. "It was very localized pain ... and after doing the ultrasound and the X-ray they could identify where the disease aspect was. So that is one thing that makes you eligible for this type of surgery," she said, adding she had no apprehensions in facing this new technology. "When you do a compartmental replacement ... the healing time is a lot faster and the knee feels more normal because all your ligaments are maintained," Dorr said. While there is little information about the preservation of cartilage, Dorr said arthritis is highly genetic. "The best way to prevent arthritis in the knee is to not get injured, so you don't get a torn meniscus or don't get a torn ligament in the knee, that's one of the best preventions for arthritis," he said. "The second thing that will increase your risk for arthritis is increased weight." In his 30 years of being a surgeon, plus publishing close to 200 medical articles, Dorr said this is one of the most exciting research projects he's associated with. "This has the potential for a significant impact in improving surgery for every patient," he said. "And it can also make every surgeon a better surgeon. So this has benefit for surgeons, and patients both."