

Opinion Mixed on 'Minimally Invasive' Joint Surgery

Some praise the cosmetic results and the sparing of muscles, but others worry about malpositioning.

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Contributing Writer

WASHINGTON — Growing public demand for minimally invasive hip and knee replacement—and increasing hype over small incisions—is driving a wedge in the orthopedic community, exciting some surgeons and fueling anxiety and anger among others.

At the annual meeting of the American Academy of Orthopaedic Surgeons, discussions of minimally invasive joint replacement and “mini” incisions drew crowds. Physicians shared surgical techniques, reported outcomes, described learning curves, and discussed what most—if not everyone—agreed are a lack of long-term effectiveness data, a paucity of randomized controlled studies, and unrealistically high public expectations fueled by direct-to-patient advertising.

“Surgeons have readily adapted these techniques despite the lack of evidence to support better outcomes,” said Jay Lieberman, M.D., of the University of California, Los Angeles. “We’ve all done this because of patient interest, the potential for improved function and cosmetics, and, though we don’t like to admit it, the fear of lost income and market share.”

There are no commonly accepted definitions for “minimally invasive” total joint replacement surgery. Published studies define the incisions for less invasive knee replacement surgery as approximately one-half the length of traditional incisions.

Most single-incision techniques for less invasive hip replacement allow for surgery through an incision that’s one-half or less of the 10- to 12-inch length of a traditional total hip incision. A newer two-incision technique, the one technique that completely spares the muscles, utilizes incisions that are about 2-4 inches in length.

Potential Advantages

The promise of the minimally invasive techniques is that reduced trauma—to the skin, soft tissue, and muscle, for example—can lead to quicker recoveries, shorter hospital stays, less pain, and less blood loss. The potential risks, physicians said, include malpositioning or instability of the prostheses, skin necrosis and maceration, fracture, and nerve palsy. So far, none of the claims have been substantiated in prospective, randomized, long-term trials.

Nearly 250,000 hip replacements and 300,000 knee replacements are done annually—increasingly in younger, active patients—according to the AAOS.

“Several years ago, when less invasive approaches were introduced, many surgeons felt it was a foolish idea,” said Aaron Rosenberg, M.D., of Rush University Medical Center in Chicago. “Ask today how many are doing small incisions, and everybody raises their hands.”

Scar appearance “is real for patients, and early recovery is real, and if you provide that, patients will line up at your door,” Dr. Rosenberg said.

In its 2004 “physician advisory statement” on minimally invasive joint replacement surgery, the American Association of Hip and Knee Surgeons said that “most positive results have been demonstrated by a small number of [high-volume] total joint centers in selected patient populations.”

Two Incisions Better Than One?

At the AAOS meeting, orthopedic surgeons spoke of positive results at their own institutions.

Richard A. Berger, M.D., reported that all of his patients undergoing two-incision hip replacement at Rush University Medical Center in Chicago now leave for home the same day of surgery, with no risk of readmission or postdischarge complications.

“There’s nothing magic about two incisions. That’s just the only way we could figure out how to do it without disturbing any muscles or tendons. ... It’s a completely muscle-sparing approach,” said Dr. Berger, who, according to the AAOS, was the first surgeon to perform total hip replacements and knee replacements as outpatient procedures.

Rather than making a single smaller incision using either a posterior or anterolateral approach, Dr. Berger makes one 4- to 5-cm incision directly over the femoral neck, which allows for preparation and placement of the femoral component of the hip prosthesis. The acetabular component is placed through a second incision, also 4-5 cm. Unique instruments and fluoroscopic guidance help ensure accurate component position and alignment.

In a presentation on “learning curve complications,” Alan E. Gross, M.D., who also uses the two-incision technique, said the technique represents “a dramatic paradigm shift” from traditional approaches and thus has a steep learning curve. It takes about 50 cases to perform the procedure successfully.

A single-incision “mini” operation uses the “same technique as traditional (surgery) except that it’s a shorter incision with less muscle dissection,” said Dr. Gross of Mt. Sinai Hospital in Toronto. The learning curve, he said, is “probably about 10 cases.”

An important difference between the two techniques is that “the bail-out with the single-incision mini is easy. You just make the incision longer,” he said.

“The bail-out with the two-incision mini is very stressful and very difficult,” Dr. Gross said. “Basically, you have to close up and start all over again.”

Positive Outcomes

Lawrence D. Dorr, M.D., of the Arthritis Institutes in Los Angeles and Inglewood, Calif., said that his mini-incision total hip replacements result in improved gait analysis results 6 weeks postoperatively and improved patient pain scores. “These operations as I perform them now are the best hip replacements I’ve ever done,” he said.

Alfred J. Tria, M.D., of St. Peter’s University Hospital at Robert Wood Johnson Medical School, New Brunswick, N.J., reported that those of his patients who had minimally invasive knee replacements (about 300) have recovered three times faster, have one-third less pain, one-third less time in the hospital, 30% less blood loss, and an increased range of motion, compared with patients who underwent standard procedures.

Other physicians presented cohort studies and case studies, most of them published, that provide short-term outcome data. Some showed benefits in terms of early recovery and cosmetics, but others showed no differences in any factor—from functional recovery to complications.

“That’s not better, but if you’re an advocate, it’s not worse either. If you’re not having more complications, perhaps it’s not an unreasonable thing to continue doing,” said William Hozack, M.D., of Thomas Jefferson University Hospital, Philadelphia.

malposition with the “mini” incisions.

Richard Rothman, M.D., of the Rothman Institute and the Thomas Jefferson University Hospital in Philadelphia, argued in a pro-con session that many recent reports have shown complication rates with minimally invasive hip replacement surgery that are three times higher than with the conventional approach.

“There’s no demonstrable advantage, and there’s increased risk to your patients,” Dr. Rothman said. “So, when I look at the facts, the nails are in the coffin.”

He and other critics of the new techniques argue that the high rate of success with traditional hip and knee replacement surgery renders the newer techniques unnecessary.

Patients are being bombarded, however, with information about the minimally invasive techniques from hospitals, companies, and some surgeons. They also find plenty on the Internet.

“I did a Google search on minimally invasive total knee placement and found 66,000-plus sites. I did a Medline search and found 13,” said Thomas Thornhill, M.D., who still uses a traditional-length incision for many of his knee replacements at Brigham and Women’s Hospital in Boston.

Ryan S. Labovitch, M.D., an orthopedic resident at the University of California, San Francisco, reported at the meeting that much of the online information about minimally invasive hip replacement surgery is marketing oriented and often incomplete or inaccurate. Only 13% of Web sites described the potential risks with either the standard or the minimally invasive surgery, he said.

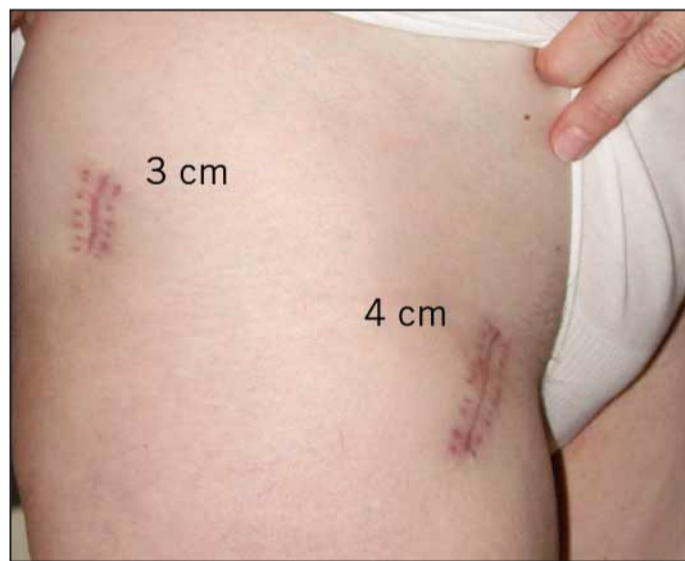
Patients’ expectations and satisfaction with the outcome—even if that outcome is scar size—are important, however, as long as surgeons are up-front and honest, others argued.

“I tell patients, I will do what I can to make the operation as minimally invasive as possible, but I will prioritize the long- and short-term results over the cosmetics,” Dr. Rosenberg said. “I also tell them, your scar size will be different if you’re a size 3 than if you’re a size 14.”

Complications, Dr. Rosenberg told his colleagues, are an inevitable part of any new surgical technique. “No doubt, minimally invasive [joint replacement] surgery has introduced a whole raft of complications,” he said. “But they will decrease with experience, better patient selection, implant selection, and [physician] training.”

“Progress comes at a price,” he added. The challenge in future research, he and others said, will be to accurately tease out the effects of less invasive surgical techniques from other changes—such as new protocols for anesthesia, pain management, rehabilitation, and patient education—that have been introduced at the same time as minimally invasive joint replacement surgery. ■

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One incision, over the femoral neck, allows for placement of the femoral component; the other, the acetabular component.

COURTESY DR. RICHARD A. BERGER

Long-term durability remains a key question for many physicians. “If we are malpositioning components even slightly, are those implants going to last as long?” Dr. Gross asked. “If it’s an 80-year-old lady, it wouldn’t matter. But if it’s a 50-year-old male or female ... it does.”

Criticism and Complications

Several speakers cited a retrospective study published last year showing no difference in blood loss and hospital stay between small-incision and conventional hip replacement surgery, and a higher risk of soft-tissue complications and component