A GIANT LEAP

How a physician jumped hurdles to save his patients’ legs

By Barbara Rose

When Kathy Hnilica walks down a beach, she never fails to turn and look back over her shoulder at her tracks in the sand. “I see two footprints that are mine,” the 48-year-old said. “It’s something I don’t take for granted.” In 1990, when Hnilica was 27, she faced losing her right leg to a cancerous bone tumor. Then she met Henry Finn, MD, of the University of Chicago Medical Center.

The Finn Knee, fabricated from titanium, cobalt chrome and high-density polyethylene, features an anatomical design.
Hnilica was one of the first patients to receive what became known as the Finn Knee System, and her treatment over the next 20 years advanced Finn’s work with a modular rotating-hinge knee to help people with cancer, severe injuries, deformities and infection. Finn’s drive to help his patients, even when it meant going against conventional medical practice, contributed to advances that made limb salvage commonplace rather than amputation.

“There were a lot of naysayers who thought limb salvage shouldn’t be done in cancer cases,” recalled Finn, chief of orthopaedic surgery at Weiss Memorial Hospital, medical director of the University of Chicago Bone and Joint Replacement Center at Weiss, and a University of Chicago Medical Center professor of surgery. “Today, rarely does a patient accept an amputation.”

Patients also undergo fewer surgeries after an implant because of Finn’s pioneering work over the past quarter century. The American Academy of Orthopaedic Surgeons cited the Finn Knee among the notable developments in the specialty’s history in 2008, and the device is recognized as one of the 20th century’s most significant orthopaedic developments in the millennium edition of *Orthopedics Today*. About 15,000 patients worldwide have benefited from the Finn Knee, according to medical manufacturer Biomet, Inc., based in Warsaw, Indiana.

These accolades are impressive but not nearly as remarkable to the patient as saving his or her leg.

“He changed my life,” Hnilica said. “I’m honored to have him as my doctor. I feel like I’m a little part of the history he’s made.”

### Aerobics Class Leads to Diagnosis of Tumor

It wasn’t her knee that initially sent Hnilica to another doctor in early 1990, but a slight hand tremor and the feeling that she was “always off a beat” in aerobics class, she recalls. An energetic 27-year-old, she regularly worked 10- and 12-hour shifts as a McDonald’s manager in the Atlanta area, where she lived.

The physician ordered a knee X-ray to confirm his arthritis diagnosis. Instead the X-ray revealed a large tumor in her femur, or thighbone, above her knee. She recalled being told that she would lose her leg. The thought of it still makes her shiver.

“Isn’t there anything you can do?” she asked. Her doctor told her about surgeons doing experimental work at the University of Chicago Medical Center. She had grown up in the Chicago area, and her parents lived there.

“I’m going home,” she decided at once.

Lying on a gurney awaiting her biopsy surgery at the Medical Center, Hnilica recalls looking down at her leg, bending her knee and wondering, “Is this the last time I’m ever going to be able to do this?”

The biopsy revealed a low-grade osteosarcoma, or Stage IA cancer. She was scheduled for surgery with Finn and Michael Simon, MD, now vice chair of the Medical Center’s department of surgery and associate dean of graduate medical education.

Since the early 1980s, Finn had been interested in saving the limbs of patients whose bones and ligaments were too badly damaged for conventional knee replacements.

Historically, hinged knees for such difficult cases had high failure rates within the first two years, so doctors had stopped using them and the technology failed to evolve.

“There were multiple early complications, including mechanical failure, bearing surface wear and debris, chronic joint swelling and fracture of adjacent bones, pain, instability and infection,” Finn recalled. “They had such a poor track record that doctors became ‘hinge phobic.’”

Finn was different: “I felt restless and discontented until I could find a solution.”

He began by modifying existing implants. “I would have to order a custom device and go into the operating room and insert it ‘freehand,’ not knowing whether it was going to go as planned,” he recalled. “I had to do this in spite of older doctors saying, ‘This has been tried and failed too many times. You can’t do it better.’”

His breakthrough came about 18 months into his practice, in 1987, when a sudden flash of insight awoke him from a sound sleep at 3 a.m. He got up and hurried downstairs to his office to diagram what became the Finn Knee. Then he faxed his drawings to an engineer who redrew them with manufacturing specifi cations and sent them to Biomet, an orthopaedic manufacturer.

By 1991, he had sufficient data from surgeries with custom prototype implants to win Federal Drug Administration approval for the new device.

The Finn Knee, fabricated from titanium, cobalt chrome and high-density polyethylene, featured a more anatomical design. Finn had figured out how to position the axle anatomically while also shifting the weight-bearing function throughout the device. The weight no longer centered on the axle bushing; it was shared with a bearing at the tibia, or shinbone. His design
provided broader surface contact with polyethylene throughout the range of motion, resulting in better tracking of the patella, or kneecap, and better long-term durability.

The device was modular, so surgeons could build exactly what they needed in the operating room. His system also incorporated tools, including contemporary instrumentation and trial components, so that implantation was more like routine surgery. “It became user friendly,” Finn explained.

Biomet began marketing the Finn Knee about a year after Hnilica underwent her first surgery in 1990. The surgical team removed the tumor and replaced 7 inches of her diseased femur with a custom cemented Finn Knee prototype. She regained full function of her leg, and her cancer did not return.

By 1991, the cemented femoral component failed and was revised with a cadaver bone attached to a new Finn Knee. Shortly after, Hnilica developed a serious complication. She began running high fevers, and tests revealed her thigh and knee were infected with a rare fungal disease, Aspergillus fumigatus. There were no reported instances of treating such a complication. Numerous physicians recommended amputation, but Finn wanted to try to save her limb.

“I felt we shouldn’t impose an amputation on her,” Finn recalled. “That’s how we improve lives and make progress.”

Hnilica recalls Finn explaining, “You may go through multiple surgeries and lose your leg anyway. It was kind of scary.”

In a series of four surgeries from September to November 1994, Finn treated the infection using a cement “spacer” impregnated with antibiotics in place of the end of her femur and knee, then re-implanted a Finn Knee. Hnilica’s leg was in a cast from thigh to ankle, stabilized by a metal rod encased in concrete. It was six months before she knew she was out of the woods.

Her successful treatment and follow-up after five years was reported in 2001 in the *Journal of Arthroplasty* (Vol. 16, No. 4). It is the only known such case and has drawn attention from Finn’s colleagues.

“Dr. Finn is a perfectionist with great determination and drive,” Hnilica said. “As a patient, I couldn’t hope for better qualities in a doctor than these. I’m so grateful that he never gave up on my case.”

Today, Hnilica works long and sometimes unpredictable hours as an assistant to the board of directors for a Fortune 100 company in the Chicago area, where she resettled permanently to be close to family and physicians. She bikes, swims, bowls, gardens and does water aerobics. An inveterate traveler, she’s gone white-water rafting and hiked up Dunn’s River Falls in Jamaica, a 600-foot climb.

“I can’t imagine what my life would have been like all these years without my leg,” she said. “It was very hard going through all the surgeries and physical therapy, but now I appreciate how precious walking is. It was a gift.”

By Barbara Rose

Over the years, Henry Finn, MD, discovered wider uses for his implants. “As we started to use them for cancer, we found many patients could benefit,” he said. “There are many situations where no other device can replace segments of bone and ligaments with any clinical utility at all.”

Louis Olguin, a retired truck driver and father of three, had reached the limits of his endurance in 1990 after years of crippling pain and 15 surgeries. His disability was related to a 1973 accident during a Marine Corps exercise at a United States training camp, during which he tore all the ligaments in his left knee and severely injured his right knee.

When he heard about Finn’s work in January 1990, shortly after his youngest son was born, he decided to risk a prototype knee replacement. “I have to do something,” he recalled telling his wife. “I can’t live like this. I think we prayed, then I cried.”

“We had that surgery, Dr. Finn said. ‘You’ll be walking in three days.’” Olguin recalled. “Here I was, all those years, in a cast two or three months at a time. With Dr. Finn, therapy came the next day. The second day I’m up on crutches, putting light pressure on my leg.”

The best part was Olguin’s realization that his crippling pain was gone. Finn, chief of orthopaedic surgery at Weiss Memorial Hospital, medical director of the University of Chicago Bone and Joint Replacement Center at Weiss, and a University of Chicago Medical Center professor of surgery, replaced Olguin’s right knee in 1995. In July 2010, he placed new parts in the left implant, which is expected to last another 20 years.

“Crutches, wheelchairs, canes — he took me off all that,” said Olguin, 57. “He saved my life. He’s my guardian angel.”

Since Finn’s early implants, he has led more than 10,000 surgeries. His work was endorsed in 1999 by an independent study at a University of Chicago gait laboratory. The study found that younger patients with Finn Knees walked and climbed stairs in a “near normal manner.”

“We now do total femur replacements,” Finn said. “Every thing above and below the joint has evolved. The design of the knee itself hasn’t changed. We got it right the first time.”