A Personal Call to a Prosthetic Invention

Max Morse for The New York Times

Van Phillips lost part of his leg in a water-skiing accident. His quest to create a better prosthetic leg resulted in the Flex-Foot.

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Published: July 2, 2008

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MENDOCINO, Calif. — When Oscar Pistorius, the double-amputee sprinter from South Africa, competes Wednesday in Milan in his latest bid to attain a qualifying time for the Summer Olympics, one determined man in this seaside village will have a special interest in the outcome.

Van Phillips, 54, an amputee who can be seen running on the headlands here, 150 miles north of San Francisco, invented and wears the Cheetah foot, which has garnered worldwide attention and controversy as the prosthetic design used by Pistorius in his effort to compete against able-bodied athletes in Beijing.

"It would be the most exciting thing to happen in my life, because the C shape was the first foot in my mind," Phillips said, referring to the concept he introduced in 1984.

In January, track and field's world governing body ruled that Pistorius's prosthetics gave him an unfair advantage and that he was ineligible to participate in able-bodied competitions. Pistorius appealed, and the Court of Arbitration for Sport reversed the decision, saying the governing body's examination of Pistorius was

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Oscar Pistorius, a long shot to reach a qualifying time for Beijing, says the 2012 London Games are a more realistic goal.

flawed. He is a long shot to reach a qualifying time for Beijing; he says the 2012 London Games are a more realistic goal.

"The Cheetah may be more advantageous than the human foot," Phillips said. "Carbon graphite may be more energy efficient." But he said he believed Pistorius should be allowed to compete.

He said many other factors were involved: timing, symmetry, the foot's attachment to the athlete's limb, an amputee's limited knee flexion and how the athlete comes out of the starting blocks. Those differences are difficult, if not impossible, to quantify.

"Maybe there is not an answer," Phillips said.

In 1976, when Phillips was 21, his left leg was severed below the knee in a water-skiing accident. At the hospital, he was measured for a pink wood-and-rubber leg and sent home. A former athlete, Phillips said it felt "like a sentence from hell."

Phillips said he became obsessed with creating a better prosthetic leg. When he was a student at the Northwestern University Medical School Prosthetic-Orthotic Center, professors discouraged him from challenging the status quo, he said. He learned that the artificial limb industry had changed little since World War II and the Korean War. Most prosthetics were designed within the cosmetic envelope — a prosthetic foot resembled the human foot. There was no energy to propel a leg.

Borrowing concepts from pole vaulting, the spring of a diving board and the C shape of a Chinese sword his father owned, Phillips imagined a prosthetic that would let him jump and land.

The result was the Flex-Foot, which included many designs of prosthetics for a range of people. One of the designs, the Cheetah, was intended for elite athletes. While working at the Center for Biomedical Design at the University of Utah, Phillips worked on weekends to create an everyday prosthetic that would allow him to run. He used carbon graphite, which is stronger than steel and lighter than aluminum.

The day after Phillips first ran down a hallway wearing his invention, he quit his job, found partners and started a company, turning his basement into a lab. He would make a leg, break it and refine it, churning out 100 legs in two years.

He said he came to realize the mistake other prosthetics designers had made: trying to replicate human bones. "You can't function unless you have a power source," Phillips said. He studied ligaments that store muscle energy, observing the tendons of porpoises, kangaroos and cheetahs, noting how the cheetah's hind leg landed and compressed, and the elastic nature of it.

In 1984, his company, Flex-Foot Incorporated, began selling his designs. Another company sold something similar, but its model was not as responsive, he said. Phillips's earliest designs were for a J-shaped foot with a heel. By the late 1980s, he was building the Cheetah, a runner's foot that was C-shaped and had no heel.

Phillips said he received thousands of letters, often from wives thanking him for giving their husbands their lives back. He worked with the three-time Paralympic medalist Todd Schaffhauser and with Dennis Oehler, the first disabled athlete to run the 100 meters in less than 12 seconds. Amputees have climbed Mount Everest and completed the Boston Marathon and the Ironman triathlon wearing Cheetahs. Teenagers have worn them to play high school football and beach volleyball.

In 2000, Phillips sold his business to Ossur, a prosthetic and orthotic company based in Iceland, which continues to sell the Cheetah and other Phillips designs. Its chief executive, Jon Sigurdsson, called Phillips "a visionary, whose ideas and progressive techniques are central to our heritage."

Paddy Rossbach, president and chief executive of the Amputee Coalition of America, said: "Van Phillips's foot changed the whole field of prosthetics. It was an extraordinary change."

Sarah Reinertsen, now 33, said that when she switched from a hollow wooden leg to a Flex-Foot at age

12, it felt as if "I was walking on a cloud." In 2005, she became the first female amputee to complete the Ironman triathlon.

"These prosthetic devices allow people to get their inner athlete out," said Alan Shanken, a 47-year-old single amputee who recently completed the Escape from Alcatraz triathlon. "It levels the playing field a little bit."

At home in Mendocino, a New England-style village at the edge of the Pacific, Phillips still designs for himself — prosthetics for skiing, surfing, swimming and scuba diving. And because his 8-year-old daughter is passionate about horses, he plans to create a design for a prosthetic that can be used for horseback riding.

Phillips also works on designing an affordable and sturdy but flexible foot for victims of land mines. The biggest obstacle, he said, is an amputee's imagination. Too many do not believe they can walk with ease or run again — until they meet Phillips or someone wearing one of his designs.

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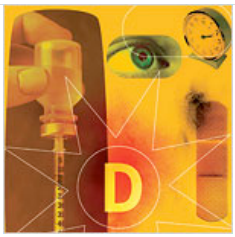

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