

# walking TALL



All that really needs to be said about the work of David S. Feldman, M.D., Assistant Professor of Orthopaedic Surgery, can be found in two brief videos of one of his patients. In the first video, a diminutive teenage girl is seen waddling across the floor of an exam room, her legs twisted at impossible angles, her head less than three feet off the floor—the effects of a rare congenital disease that played havoc with her parathyroid gland. In the second video, taped two years later, the very same girl is shown striding confidently down a hallway, fully upright.

The transformation from severely deformed teenager to one normal in appearance is nothing less than remarkable. One might even call it a miracle—except that it happens dozens of times a year at the Hospital for Joint Diseases (HJD), a leader in treating severe limb deformities as well as hard-to-heal fractures and other serious bone defects.

The science of correcting limb deformities began about a half-century ago when Gavril Ilizarov, M.D., a Russian physician, found a way to take advantage of the malleability and regenerative capacity of bone tissue. In the Ilizarov technique, an external fixator—a device not unlike the construction scaffolding found on count-

less Manhattan streets—is attached to the bone, piercing through the overlying skin and muscle. When pressure is applied to opposite ends of the fixator, the bones are very slowly pulled apart. Over time, new bone cells gradually fill in the gap, making the bones as strong as ever. Using this process, called distraction osteogenesis, bone can be coaxed to grow up to an inch a month, at almost any angle.

Despite such dramatic results, limb deformity correction remained more art than science for decades after Dr. Ilizarov's invention. This came as something of a shock to Dr. Feldman when he began to delve into the field during his orthopaedics residency at HJD in the late 1980s. "We were more

accurate in fixing our cars than we were in correcting our limbs," says Dr. Feldman, who is now Chief of Pediatric Orthopaedic Surgery.

A great advance came in the mid-1990s with the advent of the Taylor Spatial Frame. Invented by J. Charles Taylor, an orthopaedic surgeon based in Memphis, Tennessee, the device—an external fixator consisting of two rings linked by six telescoping rods—added considerable precision to the adjustment of the angles and pressures. Soon, the process was comput-

*ABOVE AND RIGHT: Sean Shah, one of Dr. Feldman's patients, is fitted with an external fixator designed to straighten his severely misshapen legs.*





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erized, taking the guesswork out of these settings, which can get quite complex when multiple fixators are needed (as in the case of the aforementioned teenager, who needed four fixators on each leg).

“We no longer have to ‘eyeball’ our corrections,” explains Dr. Feldman, whose own research has helped improve the precision of the technique. “By turning the rods at a certain rate and by a certain amount, we can accurately move the limb wherever we want it to be. And if we’re off by a little bit, we can adjust the device without going back to the OR—a big advantage.”

Adetula Omolola, a 37-year-old Nigerian, probably wishes these advances had happened decades ago, though he’s not complaining. Omolola suffers from a congenital bone disorder that severely bowed his knees and lower legs, making it hard to walk and even harder to get a decent job. (A degree in mechanical engineering earned him interviews, but prospective employers in Nigeria couldn’t see beyond his disability.)

“I had a dream of coming to the United States because I felt it was the only place I could get help,” says Omolola, who had undergone surgery in Nigeria when he was 10, but to little avail. His fortunes began to turn in 2001, when he won a lottery for an American visa.

After settling in Brooklyn, Omolola visited hospitals around the city, searching for a cure. “Because of my age, people said it was difficult, if not impossible, to help me. They said I was better off staying the way I was; surgery could make it worse. But I did not listen to them,” he adds, “because I felt I was brought here to the United States for a purpose.”

Omolola eventually made his way to Bellevue Hospital, where doctors referred him to Dr. Feldman, who had built a reputation for tackling complex orthopaedic cases. And Omolola’s case was complex indeed, requiring multiple knee surgeries as well as the use of external fixators. One leg was treated at a time, beginning in the fall of 2002.

“It was painful,” says Omolola, referring to the fixators. “At times, it was excruciating. But I was able to move around, and I figured out that



Adetula Omolola

the more weight I would bear on the leg, the lesser the pain.” After four months or so, the first leg was straight, and the process was repeated on the other leg. He also had to endure months of rigorous physical therapy,

reconditioning his muscles, ligaments, and tendons for normal ambulation.

Omolola now walks straight and tall. He has yet to find a job in engineering; nonetheless, he is grateful for a chance at a normal life. “The surgery changed my life tremendously,” he says with newfound confidence. “It even changed my personality. I sent pictures home to my family in Nigeria, and they couldn’t believe it.”

Dr. Feldman’s repairs are not limited to deformities of the arms or legs. “We can use these techniques almost anywhere in the body,” he says. “I’ve worked on hands and feet as well as on the pelvic bones. Oral surgeons now do mandible lengthening for those with severe facial anomalies. One can even fix chest deformities.”

Dr. Feldman has operated on patients of all ages, from infants to seniors. There is no ideal time to intervene, says the surgeon. “When you do the correction depends on a lot of factors, such as the stage of the disease.” On occasion, Dr. Feldman uses the technique to perform straightforward leg-lengthening operations to increase a person’s height, but only for those with extremely short stature.

Meanwhile, the field continues to evolve. Dr. Feldman has tested an internal fixator that can be adjusted by a simple twist of the limb. On the horizon are internal fixators that can be adjusted by beaming instructions to an embedded computer chip.

“This work is incredibly gratifying for a physician,” he says. “Mr. Omolola must have gained five to six inches in height. But it’s not just the height that he’s gained. It’s hard to live life as a circus act—that’s what people like him feel like sometimes. They really get their lives back.” ■