Automated bone-lengthening allows UM to stride into future of orthopedic surgery

By Jonathan Bor

Dr. Dror Paley describes surgical procedure and use of the bone-lengthening device, the Automator.

If he listened hard, John Scully could hear the faint humming that came from three tiny motors as they steadily stretched his right leg to make it just as long as his left.

Over the course of three weeks, a computerized device that fits over his leg like a cage lengthened his leg 1 millimeter a day — a total of three-quarters of an inch by the time it was turned off yesterday.

Welcome to rebolts in medicine.

"They told me a dog had it on before me," quipped Mr. Scully, a nine-year veteran of the Atlanta Falcons football team, looking not the least bit worried as he faced reporters at the James Lawrence Kernan Hospital in West Baltimore.

The offensive lineman, who stands 6 feet 5 inches tall and weighs 285 pounds, was indeed the first human to try the automated limb-lengthening device when Dr. Dror Paley, an orthopedic surgeon at Kernan, attached it to his leg Aug. 19. Sideline by injuries, Mr. Scully, said he hoped the treatment would help him back to the point where an NFL team would take a chance on him next year.

Dr. Paley could not predict whether his patient would ever play professionally again. But he expressed confidence that the computerized device, known as the Automator, could revolutionize limb-lengthening technology by stretching bones in a way that more closely mimics the natural growth processes of the body.

Mr. Scully’s problems began in 1985 when he broke his right tibia — the long bone between the ankle and the knee — and it healed in a manner that left it slightly bowed and shortened. He resumed his career, but his uneven gait had him landing awkwardly on the outside of his foot, producing bone spurs and recurrent pain.

He missed five games at the end of last year and was finally released.

Then he heard about the limb-lengthening work Dr. Paley had been doing since 1986 at the University of Maryland Hospital and its affiliated institution, the James Lawrence Kernan Hospital. Since that year, Dr. Paley has employed a technique, first introduced by a Siberian surgeon in 1981, that both lengthens and straightens bones that have been distorted by fractures and infection.

A small portion of his patients —

See BONE, 6C, Col. 1
Automator takes bone-lengthening into future at UM

BONE, from 1C

about 5 percent — are dwarfs who would like to stand a few inches taller.

To stretch a limb, he cuts the afflicted bone, passes wires resembling bicycle spokes through the bone above and below the cut, and secures the wires to a metal cage that fits around the limb.

Normally, patients must use a wrench four times a day — turning a nut that moves the wires, and the bones with them, slightly apart. New bone tissue forms in the gap that's left as the bones move in opposite directions.

The Automator does the turning without any human assistance. A tiny computer that fits on the cage signals a series of motors — three in Mr. Scully's case — to turn at programmed intervals.

In Mr. Scully's case, the device was programmed to spread the bones once each minute — 1,440 turns each day. Now that the lengthening is complete, Mr. Scully has to wear his device for another three months to give his leg more time to heal.

Initially, the three motors worked at different rates so the inside of his leg would spread faster than the outside, thus straightening the bone. Once the limb was straight, the computer was reprogrammed so the motors worked at an even rate.

Dr. Paley said the Automator should help the bones heal more firmly as they spread apart because the movement — so frequent it is almost continuous — more closely resembles the natural growth of bone.

It also removes the possibility of error that could occur when someone forgets to get out the wrench.

Dr. Paley said it might also make for a less painful procedure since it stretches the bones more slowly. With the manual method, he said, "some patients have no pain, and some have a considerable amount of pain."

Mr. Scully said he felt no pain at all, although he did report that the chummy cage-like apparatus often made sleeping difficult.

Three years in the making, the Automator is manufactured by Autogeneics Inc. of Anchorage, Alaska. The U.S. Food and Drug Administration approved the device March 16, basing its decision largely on animal studies.

FRESH SOD
"Maryland Certified"

CROSS KEYS