patients who have undergone targeted muscle reinnervation (TMR) surgery performed by Douglas Smith, MD, professor of orthopedic surgery at the University of Washington, Seattle, according to Ford. TMR surgery restores the nerve function from the remaining arm nerves to chest or upper-arm muscles, which can then provide accurate signals for controlling the hand, wrist, and elbow of the prosthesis.

*For more information on TMR surgery, see "Targeted Muscle Reinnervation: The Future Is Now,"* The O&P EDGE, *December 2007. For more information on the i-LIMB Hand and Touch Bionics, see "Form and Function: New Hand Looks, Acts Like the Real Thing,"* The O&P EDGE, *August 2007.*

Based on the feedback from users and prosthetists, the i-LIMB has undergone several improvements over the past year. Ford says it has been improved to include new strength features to support heavier lifting, new thumb mounts for greater durability, new flat tips for fingers to allow precision lifting of parts, and smoother gearboxes and motors for enhanced digit movement. Plans are underway to develop an i-LIMB able to use even more myoelectric sites, Ford adds, thus increasing control over the individual digits.

*To view a video of the i-LIMB Hand, visit www.touchbionics.com*

## ProDigits

Touch Bionics' newest product, waiting in the wings for commercial release, is ProDigits™. Ford says that ProDigits is currently in the beta field-testing stage in cooperation with several independent O&P facilities and some Hanger Prosthetics and Orthotics offices, as well as Brooke Army Medical Center, San Antonio, Texas. Improvements are being made based on users' and prosthetists' testing feedback.

ProDigits provides a partial-hand amputation solution via individually powered myoelectric control for any one or up to five prosthetic fingers. Candidates must have an amputation at the transmetacarpal level or higher of one or more fingers. It is possible to provide a ProDigits prosthesis for candidates who only have a portion of a remaining finger, but this affects the aesthetics of the overall prosthesis, Touch Bionics notes.

ProDigits can be controlled by either force-sensitive-resistor (FSR) or remote electrodes. Although the control system is based on traditional myoelectric technology, Touch Bionics has developed Bluetooth®-enabled solutions to help clinicians adjust finer motor functions to a specific user. Like the i-LIMB, ProDigits also provide a stall feature for single digits for typing, telephoning, and other everyday tasks.

## Motion Control Reaches Ahead

With its newest release—the Utah Hybrid Arm—Motion Control has made a "simpler, lighter, and more affordable arm," according to Motion Control President Harold H. Sears, PhD. "Although evolved from the U3 arm," Sears says, "it eliminates the electric elbow drive while retaining the high-tech myoelectric controls of the hand and wrist, plus the electric elbow lock."

The Utah Hybrid Arm represents Motion Control's latest innovation to the Utah Arm product line since the U3 Plus. Brought to market in 2007, the U3 Plus introduced additional comfort benefits for the wearer and marked the company's biggest step forward since the microprocessor transition in 2003, according to Sears.

"The silent freeswing feature disconnects the drive when the elbow drops to full extension so that the elbow swings effortlessly and naturally while walking," Sears says. "The dual-stage lock allows the U3 Plus to lock at an infinite number of positions, compared with the 22 possible with the U3."

Water and dirt pose a huge challenge to those using electronic prostheses in a wide range of environments. Motion Control's vanguard in the water war is its Electric Terminal Device (ETD), the first truly water-resistant ETD, Sears notes. Coming soon, Sears says, is a water-resistant EMG sensor—or "pre-amp"—highly useful in the sweaty socket environment.

Protecting the electronics by encapsulating them within the device involves incorporating what Sears

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