Carter says, “When there are quantum leaps in technology and the way I hold things, it enables me to take my integration skills to the next level. It’s actually caused people who have known me for years to do double takes and forget which one of my hands is prosthetic.”

**DESIGNED FOR MORE THAN FUNCTION**

Pattern recognition controls may help integrate prosthesis control by utilizing natural intuitive models. The myoelectric activity of the entire residual limb can be mapped and identified for various functional needs with eight pairs of electrodes. The resulting pattern of myoelectric activity emulates certain movements by tracking 80 different factors simultaneously that correspond with desired movements. This places the patient at the center of the control again, by using his or her own intuitive image of what the prosthetic control should be.

The implication is that the patient is no longer using a cognitive abstraction of opening and closing the hand by flexing and extending the wrist, but rather imagining opening and closing the image of the phantom hand itself. This use of the physiologic image applies to wrist and elbow function as well as desired grip patterns. Since there is less disruption of the intuitive operation of the hand, the patient adopts the controls more fully as a kinesthetic projection of his or her own movements.

The prosthesis no longer requires intermediary operations, but simply uses the muscles a physiologic hand and wrist would. The homunculus can embrace the imagery of the hand more readily and creates the cognitive engagement necessary for more complex hand and finger presentations. The patient does not need to isolate individual muscles but utilizes a matrix of the subtle signals that are presented by the individual residual limb. The patient really defines the configuration of contractions as the system learns of his or her movements.

When the physiologic functionality and relevance of the hand and its control is compared to prosthetic design, it is clear that one of the main goals is not only to restore functionality, but also to provide a device that can be fully integrated with the person. With increased cognitive engagement the prosthesis may provide greater social interaction in terms of language, expression, and communication and form the basis for greater integration and acceptance.

**References**

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References are available at www.opedge.com.