An Overview of Finger and Partial-Hand Prostheses

by David Rotter, CPO

Statistically, the highest numbers of amputees are finger and partial-hand amputees. Yet, until very recently, the prosthetic choices available to this population have been very limited.

Traditional Offerings

Passive functional restorations
For many years, the only viable choice for the finger-level amputee has been a passive functional device. These devices are designed to look like the missing finger and are often constructed of silicone. The custom versions of these devices require an artist to meticulously carve small grooves into the silicone to match the natural creases of the surrounding fingers. The color tone of the person’s skin is matched and a nail applied. If the prosthesis is designed for someone with a portion of their finger remaining, the device fits on top tightly to create a suction fit. If the entire finger or multiple fingers are missing, it is necessary to anchor the prosthesis to adjoining fingers or extend the prosthesis further down the hand. Although these devices don’t have parts that actively move, they still can be very functional. They add length and can help to hold objects with the remaining fingers.

The same process of sculpting and painting takes place for the partial-hand amputee. If a larger area of the hand is missing, the prosthesis must extend to the wrist or beyond for adequate suspension. These devices can have a wire substructure that allows the fingers to be formed into different positions.

Both finger and passive-hand restorations enhance function by acting to extend the leverage of the remaining hand. In addition, the psychosocial benefits of a complete and lifelike-looking hand cannot be denied.

Custom silicone providers in the U.S. that will work through your prosthetist:

Alternative Prosthetic Services
alternativeprosthetics.com

Alatheia
alatheia.com

Artech
artechlab-prosthetics.com

Liberating Technologies, Inc.
liberatingtech.com

Life-Like Laboratory
lifelikelab.com

Otto Bock Canada
ottobock.com/cps/dre/xchg/ob_us_en/hs.xsl/16502.html

RSL Steeper
rslsteeper.com/prosthetics/silicone-cosmesis

Touch Bionics – LivingSkin
touchbionics.com/LIVINGSKIN

Other companies provide semi-custom and production silicone products. Visit with your prosthetist to discuss the complete array of choices available.
Activity-specific devices
It is often useful to look at an activity and tailor a device specifically for that task. The task can be related to a person’s work or personal life. Opposition posts have historically been designed to meet the needs of someone missing fingers and wanting grasp function.

There are also companies that specialize in designing activity-specific devices for upper-limb amputees. Many of these adaptive devices expand the range of activities that amputees can engage in.

Example of partial hand

Example of opposition post

Michigan split hand

Michigan split hand being used

Texas Assistive devices
n-abler.org

TRS
oandp.com/products/trs

Hosmer
hosmer.com
**Body-Powered Options**

**X-Fingers**
X-Fingers® are designed by Dan Didrick and sold through Didrick Medical. The device is designed for and controlled by someone with the bottom portion of a finger remaining. As the remaining finger bends forward it causes the prosthetic finger joints to bend. The Fingers have been in development for 7 years and were first offered to the market 4 years ago. The first generation had a spring mechanism that limited the device’s useful application to the index and small finger. Didrick has switched to a track system that he says allows the device to address all four missing fingers. This system was implemented 6 months ago and is commercially available.

![Photo courtesy of Didrick Medical](image1)

**Didrick Medical**
didrickmedical.com

**M-Fingers**
M-fingers were introduced to the market in the summer of 2009 and are distributed by Liberating Technologies. They are designed for someone missing the entire finger. The fingers come as a kit and can be assembled to address all four missing fingers. This system was implemented 6 months ago and is commercially available.

![Photo courtesy of Liberating Technologies](image2)

**Externally Powered Options**

**ProDigits**
ProDigits™, standing for Prosthetic Digits, are designed and distributed by Touch Bionics and are the only commercially available powered finger option. The ProDigit system was officially introduced in December 2009. The fingers in the ProDigit system are the same as those used on the i-LIMB™ hand, also from Touch Bionics. The fingers can be configured to address any or all five missing digits. The device can be controlled...
in a number of different ways, including myoelectric control and touch pads. Myoelectric control relies on small amounts of electricity picked up from remaining muscles in the hand or forearm. Touch pads, also known as force-sensitive resistors, rely on pressure applied to a thin pad by a portion of the remaining hand. The final choice of control will depend on the remaining anatomy. Ideally, the set-up has two inputs: one for opening the fingers, the other for closing the fingers. Although all the fingers start closing together as a group, each finger stops on its own as it meets a certain level of resistance. This allows the person to have a conforming grip as the fingers wrap themselves around an object. Along with the i-LIMB, this is the first commercially available system that allows for a myoelectric finger with a conforming grip.

**Vincent Fingers**

Designed by Dr. Stefan Schulz, the Vincent Finger system is currently undergoing clinical trials. The system is similar to ProDigits in that each finger moves independently and is powered by its own motor. Each Vincent Finger is made from a high-strength, lightweight metal alloy. The accompanying product will be the Vincent Hand, which will have a metal alloy chassis to mount five Vincent Fingers and a sixth motor to control thumb position. According to Dr. Schulz, the company is carefully evaluating the product and will not release it commercially until they are confident that the product is viable and can be adequately supported.

**Vincent Systems**

vincentsystems.de

*Upper-Limb Perspectives is a column written by members of the ACA’s Upper Limb Loss Advisory Council.*

This article is intended for educational purposes. As is the case with all upper-extremity prostheses, one device might not meet all of a person’s functional needs. It is important that you confer with your prosthetist and establish clear goals so that together you can determine which device(s) will work best for you.