

# A Case for Body-Powered Hooks



V2P shown open and set to deliver maximum pinch force

*Photo courtesy of Ron Krenzel*

by Sean McHugh

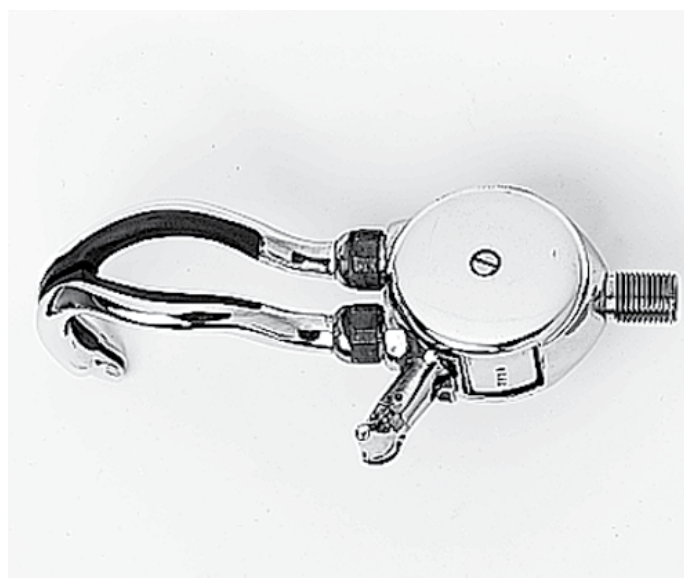
In recent years, there have been many exciting advancements in the world of upper-limb prosthetics. Much of the focus has been on developing myoelectric hands with enhanced grasping capabilities. These new hands use batteries and motors on lightweight frames, and each looks and operates more like the human hand than previous models. Will these new devices make traditional body-powered cable hooks obsolete? Maybe eventually, but at present there are still many reasons why upper-limb amputees might prefer using body-powered

hooks. For example, hooks better tolerate harsh work environments where more delicate electronic hands are at risk of damage by water or dirt. Harness and cable activation provides reliable operation without the need to charge or change batteries, and the minimalist design of most hooks affords a relatively unobstructed view of objects being handled. Very little has changed in the design of split hooks since they were patented in 1912 – until recently, that is. Brad Veatch and his team at PhysioNetics, LLC (Littleton, Colorado) have taken a fresh look at this old technology and created the Vari-Pinch Prehensor™ or more commonly, the V2P.

The V2P is a voluntary-opening (VO) split-hook terminal device that uses elastic bands to close it and generate grip force. Designed as a one-for-one exchange with existing adult-size split hooks, the unit does not require cable length or wrist unit changes, and it is compatible with standard cable and harnessing. The most notable difference between the V2P and most other voluntary opening hooks is a simple built-in mechanism that lets users select

their pinch force with a slide lever. A factory supplied bungee-style tension band delivers 3 pounds of tip pinch at the low setting, climbing to almost 9 pounds at the high setting through six discrete positions or “click stops.”

In the lightest tension setting, users can pick up delicate objects such as eggs or plastic water bottles without crushing them. Moving the slide lever to higher positions increases the ability to hold heavy objects with a secure grip. A significant advantage of the V2P’s adjustable pinch force capability is that stresses applied to the user’s body through the control harness can be reduced by using the V2P in its lightest setting for most activities and escalating to a more powerful pinch only as needed to get a task done.



Sierra 2 Load Voluntary Opening Hook

*Photo courtesy of Hosmer Dorrance Corporation*

“We believe this innovation will particularly benefit bilateral amputees who tend to favor body-powered systems and who are most at risk for repetitive stress injuries and fatigue,” says Veatch. If even greater force is needed, additional bungee bands or common office-supply rubber bands can be easily applied or removed without a special tool or a trip to the prosthetist’s office. This ability to change bands without assistance should prove especially helpful for those who live in remote regions without easy access to an O&P provider.

There are three other body-powered hooks on the market that offer a choice of two selectable pinch force levels. The Sierra 2 Load Voluntary Opening Hook from Hosmer Dorrance Corporation ([hosmer.com](http://hosmer.com)) permits pre-selection of pinch force equal to 3.5 pounds or 7 pounds through a load selector button on the thumb. Otto Bock HealthCare ([ottobockus.com](http://ottobockus.com)) makes two versions of their Standard Two-Load Hook, which uses tension springs and a thumb lever selector to choose between a light or heavy pinch force. Each version has a slightly different hook finger shape. I did not have the opportunity to test the Hosmer or Otto Bock hooks prior to writing this review of the V2P, but I would welcome the chance to do so in the future.

While similar in shape, length, weight and connection hardware to a traditional farmer’s hook, the V2P incorporates some significant



**The Otto Bock Standard Two-Load Hook**  
A flick of the small lever (usually done by brushing against the leg) lets you select between two different pinch forces

*Photo courtesy of Otto Bock HealthCare*

differences. Tension bands are strung across the opening area of the hook, and while I expected them to get in the way of grasping large objects, I found instead they provide additional stability and some shock absorption, especially when handling yard and garden tools. The hook itself has a much beefier profile than standard hooks, and its extra surface area adds stability when holding objects such as drinking glasses or bottles. Replaceable elastic fingertips can be put on or removed easily as needed to give firm, positive grip for slippery objects.

I found these fingertips useful for picking up coins, handling office papers and turning book pages. They also provide a friendlier, scratch-free interface with the steering wheel and radio controls in my car. Rugged activities can make the fingertips come off, and so, after searching through the garden to find them a couple of times, I recommend taking them off prior to shoveling, raking, etc.

I find the V2P to be a welcome addition to my prosthetic toolbox. It comes in engineering polymer, aluminum and stainless steel versions, and can be purchased directly from PhysioNetics at [physionetics.org](http://physionetics.org). ■

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