that really comes into play is when
the shoulder is flexed or abducted
so the arm is in front of him. The
frame needs to be able to withstand
that much torque without losing
contact with either the anterior or the
posterior electrode. The trim lines
reach toward midline on both the
anterior and the posterior to stabilize
electrode contact. He needs to operate
the device while sitting as well as
standing, so interface length is a
critical factor.”

NOTHING CAN REPLACE THE
HUMAN HAND
Rosecrans has always worked with
his hands, whether it was on the job
as an electrical lineman for several
years, at the sawmill, or hunting and
fishing in his native Idaho. During
his brief time as a prosthesis user, it
has become clear to him that nothing
can replace the human hand, and
having more than one type of terminal
device is essential to being active. “The
bebionic hand looks amazing,” he says,
especially at the end of my bionic-
looking prosthesis. I’m learning how to
do the grip patterns and I like wearing
it when I go out. When people see it,
their faces light up, just like mine did
when I first saw it. But you can’t do
everything with it. When I do anything
work related, or if I go hunting, I
switch to the ETD just because it’s
easier to use and stronger for those
sort of situations.”

As upper-limb specialists, Lang,
Baun, and Hays hear this feedback
from many patients. “I often compare
it to having more than one pair of
shoes,” Baun says. “We don’t wear
athletic shoes for everything, right?
So the terminal device really needs
to match the situation or activity.
The bebionic works better for
holding certain items, things that
are cylindrical like water bottles or
soda cans. And in social situations
where people are shaking hands, it’s
more appropriate to do that with the
bebionic hand.”
The ETD has a higher grip force,
making it especially suitable for
holding and working with heavy
items. Rosecrans says he has already
used the ETD while hunting. When
he’s tying hooks to his fishing line,
he uses his ETD and the rotator
component of his wrist. The
prosthetic team hopes to add some
custom, activity-specific devices in
the future, like a nonelectric device
to use for fishing, and other tools for
recreation.

THE NECESSITY OF
OCCUPATIONAL THERAPY
Learning how to use a complex
prosthetic system takes time and
effort. Rosecrans has to control the
hand, the wrist rotation, and elbow
flexion and extension, and he has to
manually pre-position and lock the
shoulder. “There’s a lot of cognitive
demand associated with this high-
level [prosthesis]. It requires more
patience and practice time to really
become a skilled user,” Baun says.
“The reality is that Sam may choose

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