

# Robo-Legs

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## Analyze Visuals ▶

This photo shows Cameron Clapp competing at the 2005 Endeavor Games. Based on his body language and facial expression, what can you **conclude** about Clapp's personality?

## New prosthetic limbs<sup>1</sup> are providing increased mobility for many amputees—and blurring the line between humans and machines

**W**ith his blond hair, buff torso, and megawatt smile, Cameron Clapp is in many ways the typical California teenager. There are, however, a few things that set him apart: For starters, this former skater boy is now making his way through life on a pair of shiny, state-of-the-art<sup>2</sup> robotic legs. **A**

“I make it look easy,” he says.

Clapp, 19, lost both his legs above the knee and his right arm just short of his shoulder after getting hit by a train almost five years ago near his home in Grover Beach, California. Following years of rehabilitation and a series of prosthetics, each more technologically advanced than the last, he has become part of a new generation of people who are embracing breakthrough technologies as a means of overcoming their own bodies’ limitations.

“I do have a lot of motivation and self-esteem,” Clapp says, “but I might look at myself differently if technology was not on my side.”

The technology he’s referring to is the C-Leg. Introduced by Otto Bock HeathCare, a German company that makes advanced prosthetics, the C-Leg combines computer technology with hydraulics. Sensors monitor how the leg is being placed on the ground, and microprocessors<sup>3</sup> guide the limb’s hydraulic system, enabling it to imitate a natural step. It literally does the walking for the walker. The technology, however, is not cheap; a single C-Leg can cost more than \$40,000. **B**

The C-Leg is one of the examples of how blazing advancements, including tiny programmable microprocessors, lightweight materials, and keener sensors, are restoring remarkable degrees of mobility to amputees, says William Hanson, president of . . . a Massachusetts company that specializes in developing and distributing advanced prosthetic arms and hands.

**mobility** (mō-bīl’ī-tē) *n.*  
the capability of moving from place to place

### **A ORGANIZATION**

Reread lines 1–5.

To whom are you introduced here? What does Marriot emphasize about him?

### **rehabilitation**

(rē’hə-bīl’ī-tā’shən) *n.*  
the process of restoring someone to physical capability, usually through exercise and physical therapy

### **B MONITOR**

Examine lines 16–21.

What words and phrases help you **visualize** Clapp’s legs? Compare your mental image with the photo on page 936.

**keener** (kēn’ər) *adj.* more acutely sensitive

1. **prosthetic limbs** (prōs-thēt’īk līmz): artificial arms and legs.

2. **state-of-the-art**: made using the newest technology available.

3. **microprocessors**: tiny computer parts that operators can program, or give new instructions to.



Clapp's prosthetic legs feature several attachments to suit different purposes.

### Three Sets of Legs

For example, Clapp, who remains very involved in athletics despite his  
30 condition, has three different sets of specialized prosthetic legs: one for  
walking, one for running, and one for swimming. He put all of them to  
use at the Endeavor Games in Edmond, Oklahoma—an annual sporting  
event for athletes with disabilities—where he competed in events like the  
200-meter dash and the 50-yard freestyle swim. **C**

#### **C** MONITOR

What **questions** do you have after reading this paragraph? Decide whether to reread or read on for answers.

### Man or Machine?

But increased mobility is only part of the story. Something more subtle, and possibly far-reaching, is also occurring: The line that has long separated human beings from the machines that assist them is blurring, as complex technologies become a visible part of the people who depend upon them.

40 Increasingly, amputees, especially young men like Clapp, and soldiers who have lost limbs in Afghanistan and Iraq, are choosing not to hide their

prosthetics under clothing as previous generations did. Instead, some of the estimated 1.2 million amputees in the United States—more than two-thirds of whom are men—proudly polish and decorate their electronic limbs for all to see. . . . **D**

Many young people, especially those who have been using personal electronics since childhood, are comfortable recharging their limbs' batteries in public and plugging their prosthetics into their computers to adjust the software, Hanson says.

50 Nick Springer, 20, a student at Eckerd College in St. Petersburg, Florida, who lost his arms and legs to meningitis when he was 14, recalls doing just that at a party when the lithium-ion batteries<sup>4</sup> for his legs went dead.

"I usually get 30 hours out of them before I have to charge them again," he says. "But I didn't charge them up the day before."

### Terminator Legs

When his legs ran out of power, he spent most of his time sitting on a couch talking to people while his legs were plugged into an electrical outlet nearby. According to Springer, no one at the party seemed to care, and his faith in his high-tech **appendages** appears unfazed. "I love my Terminator<sup>5</sup> legs," he says. **E**

60 Springer also remembers going to see *Star Wars: Episode III—Revenge of the Sith* with his father. While he liked the movie, he found the final scenes—in which Anakin Skywalker loses his arms and legs in a light-saber battle and is rebuilt with fully functional prosthetics to become the infamous Darth Vader—a little far-fetched.

70 "We have a long way to go before we get anything like that," he says. "But look how far humanity has come in the past decade. Who knows? The hardest part is getting the ball rolling. We pretty much got it rolling."



Nick Springer plays hockey with the help of specially-made prosthetics. © Dith Pran/New York Times/Redux.

### **D** ORGANIZATION

Is the topic still Clapp and his sets of legs? If not, what is the new topic? How is it related to the previous topic?

**appendage** (ə-pĕn'dĭj)  
*n.* a body part, such as an arm or leg, that is attached to the main part of the body

### COMMON CORE RI 5

### **E** ORGANIZATION

In a magazine article, subheads often signal that the writer is shifting to a new idea. But sometimes a subhead is inserted mainly to break up a long block of text. Does the subhead "Terminator Legs" introduce a new idea, or do lines 55–59 support the idea introduced under the previous subhead? Explain your answer.

4. **lithium-ion batteries** (lĭth'ē-əm-īŏn' băt'ə-rĕz): very light, small batteries with a great deal of energy packed into a small space.

5. **Terminator**: a robotic character in a 1984 film, *The Terminator*.