



# On the Job With an Upper-limb Prosthesis



By Sherri L. Edge

The ability to use our hands is a basic requirement for most jobs. Working usually means relying on our hands to assemble, carry, create, drive, hold, lift, open, type, and so much more. Hands are complex tools that help us interact with the world around us and facilitate an array of jobs based on manual labor.





Bettors says that driving heavy equipment and handling bulky tools with his prosthesis "feels natural" to him.

*Photographs courtesy of Arm Dynamics.*



For these reasons, it's not surprising that according to the US Bureau of Labor Statistics, on-the-job accidents frequently involve hands, with an average of 123,990 hand injuries occurring in the workplace each year.<sup>1</sup>

While some of these are minor and others can be resolved over time, the

loss is most common in people 50 and older, while upper-limb amputation most often occurs among young adults who are in their prime working years.

Holistic upper-limb prosthetic rehabilitation provided by a team of specialists offers people a proven path toward new goals and possibilities. The

### Holistic Care Heals Deeply

While upper-limb amputation can be a devastating physical loss, it is equally important to acknowledge the psychological toll experienced by patients and their families. The majority of people with upper-limb amputations have survived a traumatic event and may need consistent emotional support and guidance during their rehabilitation process.

John Miguelez, CP, FAAOP(D), AD senior clinical director, innovated a holistic model of care that now includes 11 years of outcome measures data to draw from. "At each center, an upper-limb prosthetist and a clinical therapy specialist work side by side to help patients address the physical and psychosocial challenges that are part of limb loss," he says. "By screening for concerns like anxiety, depression, substance abuse, and residual limb pain, we can identify potential obstacles early on."

About 90 percent of people with upper-limb loss experience a partial hand amputation, losing one or more digits or having an amputation through the palm. Many of these injuries occur on the job, and from their first prosthetic evaluation forward, most patients are planning to return to work.

Mark Betters is a construction supervisor whose left hand was crushed on the job in 2017, resulting in the amputation of his thumb, index, and middle fingers. There were two aspects of his life that he was concerned about losing: being an active father and husband and returning to work. "Work was important, and I needed to earn a living and all that, but for me, my wife and kids are everything," he says. "They all have their different activities, and I just didn't want to miss out on any of that."

Partial hand amputations are sometimes perceived to be less damaging than higher levels of upper-limb loss. Scott Spring, CP/L, a clinical manager at AD, works with all levels of upper-limb loss, and sees a lot of partial hand amputations. "It's critical to understand that this level of loss is just as damaging ➔



loss of part of a hand or arm is forever.

Suzi Phelps, PhD, a clinical psychologist who specializes in resolving trauma, sums it up: "The loss of a limb brings everyday life to a halt. Feelings of sadness and depression, panic about the future, how you'll make a living or take care of your children—these sorts of concerns are common and normal, especially during the first few weeks."

The primary causes of upper-limb amputations are traumatic, work-related accidents.<sup>2</sup> That's a stark contrast to lower-limb loss, which is caused primarily by illnesses like diabetes, vascular disease, and cancer. Lower-limb

sooner patients are evaluated by a prosthetist and clinical therapy specialist and learn about their prosthetic options, the better. The clinicians at Arm Dynamics (AD) have helped thousands of people with upper-limb amputations identify their rehabilitation goals and provided the appropriate prosthetic options and training for reaching those goals.

For some individuals, their goal is the pursuit of a meaningful hobby or avocation, while others, especially people whose work has been disrupted by injury, are more focused on returning to their jobs or starting new ones.





Parker says that her customized transhumeral prosthesis is a great conversation starter with customers at Trader Joe's.

and traumatic as higher levels of amputation,” he says. “It may be lower, but that doesn’t make it less significant. Partial hand amputations often require multiple surgeries and months of intensive hand therapy to prepare the injured hand for a prosthesis.”

Following his accident, Betters decided to have a toe to thumb transfer, an unusual surgical option that his prosthetic team recommended to improve his overall hand function. After several months of healing and hand therapy, he was fitted with a custom prosthesis that features two heavy-duty Point Design positional digits. The carbon-fiber frame has a soft silicone interface contacting his skin.

“Taking a special interest in the patient’s work is very important,” says Spring. “We spend quite a bit of time listening to them talk about the work they do and describing the hand positions they use.”

Each of Better’s prosthetic fingers can hold up to 100 pounds of weight—

important for someone who carries five-gallon buckets of oil and bulky parts for drilling rigs. Betters says he uses his prosthesis to do everything he used to do with his hand. “My new thumb, together with the Point Digits, just feels natural. This is who I am now, and I don’t ever wish for it to be any other way. This is my life, and everything is good.”

### Comfort, Function, and Training Are Key

Current research focusing on the use of upper-limb prostheses in the workplace is scarce. A 2017 report, “The Promise of Assistive Technology to Enhance Activity and Work Participation,” examined past research papers that looked at the connection between upper-limb loss and being able to work. According to the study, individuals with upper-limb loss who use a prosthesis are more likely to be employed, and being employed is associated with increased long-term acceptance of a prosthesis.<sup>3</sup>

These findings correlate directly to improving quality of life for people with limb loss and align with the patient outcome data that AD has been tracking at their Centers of Excellence since 2012.

Individuals with upper-limb amputations who are fitted with a comfortable, functional device and receive extensive prosthetic training specific to job tasks can usually return to the workforce. Wendi Parker is a good example of someone who has been employed with the same company for 20 years, both before and after her left elbow was severely injured in a snowboarding accident. As a crew member at the local Trader Joe’s, she had disability insurance and an employer who promised to hold her job until she could return.

“I was that one percent who had every possible complication with my shattered elbow,” she says. “I rejected a cadaver bone and an artificial elbow, had more than 20 surgeries, and made it through a massive infection.”

She first returned to work with a ➔



nonfunctioning left arm, but continued pushing forward through multiple surgeries, excelling at her job, and getting promoted to assistant manager. “Twelve years after my injury, I decided to have my arm amputated above the elbow,” Parker says. “I’d lived with nearly constant nerve pain in my elbow and hand, and I just got to the point where it felt like the only option left. So, for me, losing my arm was like gaining my life.”

Parker says that two weeks after her amputation, “I hit the ground running and I haven’t slowed down yet.”

Her prosthetist, MacJulian Lang, CPO, says, “It all starts with making sure that each person is fitted with the right prosthesis for the job they’re going to do, and in Wendi’s case, it was an activity-specific device. Our clinical therapy specialist provides prosthetic training

that focuses on each person’s functional goals. They often visit the person’s job site to give training on specific work tasks so the patient can excel.”

Parker’s prosthesis has three interchangeable terminal devices: the TRS Multi-D Pivot that she uses at work and for weightlifting at the gym, the TRS Shroom Tumbler for yoga, and the Toughware Variable Pinch-force Prehensor (V2P) for holding onto a variety of objects, including the products she stocks at Trader Joe’s.

“I put on my arm in the morning and wear it at work all day,” she says. “I lift boxes, stock products, break down pallets, and check out customers. When I get home, I take it off to shower, then put it back on so that me and my kiddo can get outside and have some fun.”

Parker and her son like paddleboarding, gardening and cooking, going to the skate park, and four-wheeling.

When patients return to work, Lang says that he calls regularly to check on how they’re doing on the job with their prostheses. “If they have any issues with the fit or function, we want to quickly address those and fix the problem. The whole idea is to ensure the prosthesis helps them thrive on the job.”

### Collaboration Resolves Problems

Building a broad collaborative team is a key strategy for optimizing patients’ prosthetic rehabilitation. AD’s patient outcome measures data illustrates why complex injuries like traumatic limb loss require collaborative care: 57 percent screen positive for depression, ➔

Linares uses his left hand to steer and his ETD to raise and lower the forks.





21 percent are positive for PTSD, and 46 percent report extreme levels of pain. Holistically managing these issues and optimizing the prosthetic rehabilitation experience depends on consulting with a range of specialists.

The collaborative team can include the patients' family, physicians, prosthetists and prosthetic technicians, occupational/physical/hand therapists, psychologists or counselors, case managers, and insurance providers. Patients are at the center of the team, receiving coordinated and cohesive guidance from these specialists.

Our prosthetists and therapists find it beneficial to establish an extra layer of communication and collaboration with the patients' case managers. It can be important for therapists to observe patients using their prostheses at work, provide functional guidance, and offer suggestions for modifying the arrangement of the work area, and in some cases, the patients' homes.

Hugo Linares had been operating industrial forklifts and other vehicles on the job for about ten years when an accident at work resulted in a transradial amputation. Initially, all he could think about was how disappointed he was with himself for not being able to prevent his injury. "It took me between one and two years to recover my thinking and move forward with my life," he says. "I wanted my hand back."

Like most workers' compensation patients, Linares was concerned about being able to get back to work and provide for his family. "My doctor sent me to Arm Dynamics to learn about prosthetics. They helped me a lot to be able to use a prosthesis at work and at home, and even to lift weights at the gym and work in my yard," he says.

Linares and his care team began planning his return to work ten months before he actually went back. Based on his need for a highly functional, durable device on the job, they decided that a myoelectric prosthesis with a TASKA hand and an ETD, Motion Control by Fillauer, Chattanooga, Tennessee, were

Linares has the option of alternating between an ETD and a TASKA Hand, depending on the work tasks he's doing.



the most appropriate options. He also has a body-powered arm with a V2P, Toughware, Westminster, Colorado.

AD's clinical therapy specialist and a vocational rehabilitation counselor worked together to help Linares be successful on the job with a prosthesis. "As soon as he was back at work, we contacted the employer and scheduled a worksite visit," said Kerstin Baun, MPH, OTR/L, AD national director of therapeutic services. "It was helpful to see the space and how he was using his prosthesis for tasks he needed to do. We provided guidance regarding environmental modifications and worked with Hugo as he practiced operating a forklift and a pallet jack with his ETD [electronic terminal device]. This included positioning his ETD and being aware of his body mechanics while he worked."

"I work at the same company but in a different job in receiving and shipping," Linares says. "I still drive a forklift to load trucks and stack pallets in the warehouse, and I deliver lots of boxes to other buildings. I also use a computer every day and I really like learning new software programs."

Linares says that he's glad to be back at work and have an income. "One of my main concerns is to be positive,

because if you're negative, you're not going to get anywhere. I can see that without a prosthesis, there's a lot of stuff I couldn't do."

## Conclusion

The loss of an arm, hand, or fingers means being deprived of what seems like an essential tool for life and work.

In the face of devastating physical and emotional trauma, a collaborative team can ensure that the physical and psychosocial concerns of individuals with upper-limb amputations are addressed. Holistic prosthetic rehabilitation offers a proven way forward and helps put people like Betters, Parker, and Linares in a position to thrive. By accepting a prosthesis as a useful tool, people can regain their independence, be more productive, successfully work a job, and generate income.

Being on the job with an upper-limb prosthesis is an obtainable goal and already a reality for hundreds of Americans. **O&P EDGE**

*Sherri L. Edge is a writer and video producer who specializes in marketing and communications for the prosthetics industry.*

*References are available at [opedge.com](http://opedge.com).*