Wells Middleton, who lost his hands in a crushing accident at work, appreciated the comfortable, controlled environment of therapy. *Images courtesy of Arm Dynamics.*

Function First

How Occupational Therapists *Amplify* Success for Upper-limb Prosthesis Users

SUDDEN UPPER-LIMB LOSS or absence is a life-altering experience. As occupational therapists who specialize in upper-limb prosthetic rehabilitation, we are keenly aware of the global impact that limb loss has on individuals and their families. This includes people with congenital limb differences, who also face unique physical and emotional challenges over the course of their lives. The absence of an upper limb is a visible difference that may impact individuals' functional independence, as well as their appearance, self-perception, and pursuit of a vocation.

By Kerstin Baun, MPH, OTR/L, Elyssa Vizzier, OTR/L, and Sherri Edge

Including occupational therapists on a collaborative team that places patients at the center ensures their needs and goals are prioritized. With training in the phases of rehabilitation, and a unique understanding of the psychosocial aspects of limb loss, occupational therapists can play a pivotal role in helping patients become successful prosthesis users.

As prosthetists fit and build a prosthesis, they consider all aspects of the device, including socket fit and comfort, suspension, design, appearance, and function. By collaborating with an occupational therapist, prosthetists can offer their patients personalized therapy, prosthetic training, help with psychological challenges, and more. This level of support provides the foundation for new prosthesis users to gradually regain their independence and enjoy a more active lifestyle.

The larger clinical team we work with at Arm Dynamics (AD) combines prosthetic care and therapy for every patient across the continuum of care. We hope this article provides useful information to clinicians about the essential role that occupational therapists can play in upper-limb prosthetic rehabilitation.

THERAPISTS SUPPORT THE PROSTHETIC JOURNEY

Following an upper-limb amputation, regardless of the level, patients are faced with physical and emotional concerns that need to be addressed as they prepare for being fitted with a prosthesis. The mission of therapists in upper-limb prosthetic care is to help patients achieve their goals while using a prosthesis and incorporating it into their lifestyle. This may involve returning to meaningful activities, maximizing their daily independence, and going back to work.

It's beneficial to begin working with patients as soon as possible after their accidents or surgeries to provide support and guidance with wound care, range of motion, edema, limb shaping, and self-care. In cases where amputation surgeries are scheduled, it's helpful to meet patients in advance to begin building rapport and answering their questions. Early support from therapists can give people with recent amputations a sense of hope and optimism for their future. Providing patients with initial information about the prosthetic options that are available for them can be encouraging and ideally is done in collaboration with a prosthetist and therapist.

About 80 percent of people with upper-limb loss have survived a traumatic injury and may be struggling with serious emotional issues like anxiety, anger, depression, and post-traumatic stress disorder.[1] At AD, therapists use a patient-reported screening tool called the Wellness Inventory to facilitate a discussion of how to support a patient's psychosocial needs. This may include helping to find an experienced counselor or psychologist or a peer support group that meets in their community or online. Therapists may also match patients with people who are further along in their prosthetic rehabilitation and want to be peer support advocates. This is an excellent way for new patients, who usually have no experience with prosthetic devices, to get the lived-experience perspective and talk about their concerns with a person who has been in a similar situation.

A patient's psychosocial needs may fluctuate over time, and it's important for therapists to continue addressing these needs throughout the continuum of care.

Some key resources for upper-limb patients and their families are:

- *Amplitude* magazine and Living with Amplitude (livingwithamplitude.com)
- The Upper Limb Library (arm dynamics.com/upper-limb-library)
- *inMotion* magazine (amputee-coalition.org/limb-loss-resource-center/publications/inmotion)
- The Amputee Coalition (amputee-coalition.org)

Therapists and prosthetists may also recommend support groups in their communities.

Steve Altieri, left, a new prosthesis user, fist bumps with peer advocate Brian Sims.

FOUR PHASES OF PROSTHETIC REHABILITATION

A holistic model of care addresses all phases of prosthetic rehabilitation: perioperative, pre-prosthetic, prosthetic training, and advanced training.

The perioperative phase focuses on physical healing, including pain management and identification of psychosocial needs. Therapists teach patients about basic wound care and strategies for pain management. If adaptive equipment is necessary, therapists assist patients with learning how to use these aids. Some patients and/or family members may want to discuss prosthetic options in the perioperative phase.

The pre-prosthetic phase continues many of the interventions started in phase one, including pain management, scar management, and edema control. Therapists may also initiate or continue educating patients about their prosthetic options. If a patient is a candidate for a myoelectric prosthesis, it's beneficial for the therapist to begin muscle training, which speeds up the patient's ability to control a prosthesis.

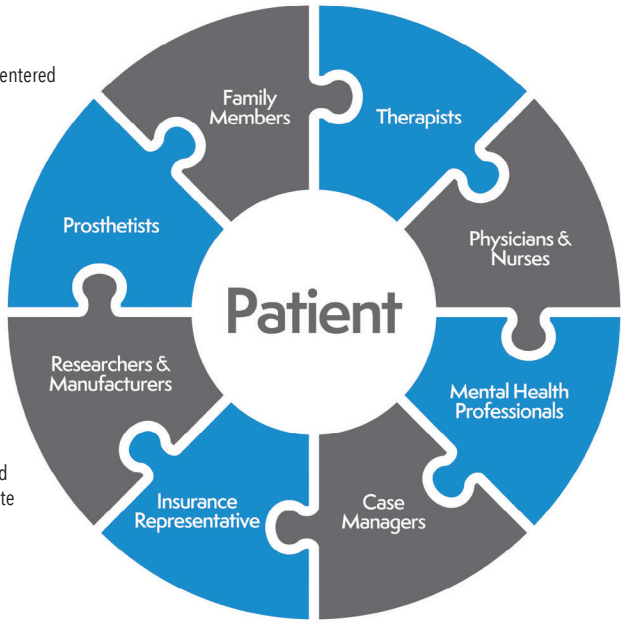
In the prosthetic training phase, focus is shifted to skill development and functional skills training; therapists guide patients in how to use their prostheses to complete functional tasks, specifically activities of daily living. This includes a range of tasks such as buttoning, tying shoes, writing, typing, eating, drinking, and cutting food. Patients benefit from practicing meaningful activities that incorporate their personal belongings. Having patients bring in their favorite coffee cups, kitchen knives, or personal care items to use in therapy helps set them up for success when they return home.

In the advanced training phase, patients perform more complex activities, not only in clinic but also in other environments where they will be using their prostheses. Advanced training continues across patients' lifetimes, whenever they receive new prostheses or key prosthetic components or when they need to learn new skills for a specific job or hobby.

For greater detail regarding the phases of rehabilitation, readers are encouraged to review the Veterans Affairs and Department of Defense Clinical Practice Guideline for The Management of Upper Extremity Amputation at healthquality.va.gov/guidelines/rehab/uear/index.asp.

The Collaborative Team

This expansive team is centered around the patient and encompasses family members and friends. The collaborative team includes prosthetists and therapists, whether practicing independently or on clinical teams. Other members are physicians and nurses, psychologists, case managers, insurance representatives, and even the researchers and manufacturers who create prosthetic components.



THE ART OF COLLABORATION

Guiding a person to a successful prosthetic outcome involves the skills and support of numerous professionals.

After a traumatic amputation, the patient is typically seen by a local therapist. Often, this is a certified hand therapist who may or may not have experience with prostheses. Community-based therapists frequently address a range of patient needs including improving range of motion, building functional strength, desensitizing the residual limb, pain management, limb shaping, wound care, edema control, scar tissue management, hand dominance retraining, and addressing psychological needs.

As therapists who specialize in upper-limb prosthetic care, we provide resources and support to community-based therapists across the United States, collaborating with them to help lay the foundation for a patient to be fitted with prostheses. In cases where a patient travels to an AD center for prosthetic care and then returns home to work with a local therapist, we are available to help train the therapist about how the prosthesis operates.

At our centers, occupational therapists work in conjunction with prosthetists during the fitting process to ensure the prosthesis is optimally fitted and comfortable. Prosthetic fit is put to the test as patients perform skill building and functional tasks during therapy.

Whether a device is body-powered, activity-specific, or myoelectric, therapists instruct and observe patients, offering guidance on positioning the prostheses and maintaining correct posture. Myoelectric users are also trained in how to use muscle signals to activate the prostheses. Therapists grade both the complexity of each task and the planes of movement that are required as the patient's skill level improves. Therapy is an excellent time for therapists and prosthetists to observe patients together and review the comfort, suspension, and function of the prostheses. Before final definitive prostheses are created, the prosthetists make adjustments as needed to maximize patients' outcomes.

OUT OF THE CLINIC AND INTO THE COMMUNITY

When first learning to use a prosthesis, it is more comfortable for patients to do therapy tasks in the safe space of a clinical setting. Yet knowing that most of life takes place outside the clinic, it is critical to bring therapy into a variety of real-world settings. Helping patients acclimate to using their prostheses in public places is an essential part of rehabilitation. If this aspect of therapy is overlooked, patients may be able to use

their new devices flawlessly in the clinic, and then feel reluctant to wear them after they leave. Some good situations for therapy outside the clinic include:

- Going to a grocery or other retail store and using the prosthesis to pick up and carry items, check out and pay, and carry bags
- Eating in a restaurant and using a variety of silverware and glasses they have never used before
- Going to a convenience store and getting a self-serve drink
- Working out at the gym or in a public park
- Using public transit or even just walking down the street or sidewalk, learning how to become comfortable with other people's responses

Brad and Momo Jones are part of their son Kanoa's collaborative team and work together with his prosthetist and occupational therapist. Kanoa, age five, was born with a partial left hand and was fitted with his first prosthesis when he was two and a half.

On-the-spot problem-solving while out in the community is a wonderful opportunity for patients to learn how to overcome minor setbacks and continue to thrive while using their prostheses in real life.

Visiting patients' homes or workplaces is another excellent way to take therapy out of the clinic and into patients' lives.

Alex Krueger, who lost the digits on his right hand in an accident at work, said his priority was getting back on the job.

During this phase of therapy, it is important to help patients build their confidence by talking about different challenging scenarios they may encounter and coming up with potential solutions together.

MEASURING SUCCESS WITH AN UPPER-LIMB PROSTHESIS

Measuring success with a prosthesis can be done with formal assessments or by informal observation of a patient. For example, when a patient comfortably wears a prosthesis for long periods of time, becomes more active, or returns to work, these are informal signs of success. Formal assessments rely on multiple validated outcome measures to generate objective data that guides individual patient care and informs future clinical decisions. Our outcome measures illuminate the importance of holistic care in increasing the acceptance rate and long-term use of upper-limb prostheses.

Our clinical team uses a combination of patient-reported and performance-based outcome measures to ensure that patients are achieving optimal prosthetic outcomes.[2] For example, patients may report satisfaction with function, but a performance-based measure could reveal skills that would benefit from further training. Administering patient population-specific outcome measures at multiple points throughout the continuum of care ensures that our patients' functional goals are reached, and their skills are retained.

LET'S OPTIMIZE PATIENT OUTCOMES

People who experience upper-limb loss have complex rehabilitation needs, and many will need to or choose to wear prostheses for the rest of their lives. Occupational therapists have the knowledge and skills to holistically support patients' journeys from limb loss to becoming successful, long-term prosthesis users.

Prosthetists and therapists in the field have an opportunity to make a positive impact on these patients' outcomes by learning about and implementing some of the strategies this article presents. The goal of maximizing each patient's rehabilitation resonates with clinical care providers of every discipline. O&P EDGE

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