

A Therapeutic Touch for UPPER LIMB

The benefits of and strategies for collaborating with occupational therapists for improved outcomes

By **CHRISTINE UMBRELL**

NEED TO KNOW:

- For prosthetists who treat patients with upper-limb loss, working closely with occupational therapists (OTs) is key to successful patient outcomes.
- Not only do OTs help train patients in using their new devices, they also help them to integrate the prosthesis into their life, and teach them to perform increasingly complex tasks that will aid them in carrying out activities of daily living.
- In addition to teaching “skills drills,” OTs consider the environments in which clients will be using their devices and help them translate the skills they learn in therapy into meaningful activities.
- OT-prosthetist partnerships add value when treating limb loss patients who experience pain—whether residual limb pain, phantom pain, or general body pain that may have been preexisting.
- More training is needed to educate more OTs on working specifically with limb loss patients, and prosthetists can help fill the void by raising awareness of the profession and offering training courses to area OT professionals.

AFTER YEARS OF failures in finding a prosthesis that would assist their son in using his left arm, Lucas's parents turned to the team at Handspring in Salt Lake City. Months of virtual preparation involving prosthetic evaluation and occupational therapy—Lucas lives in Hawaii—resulted in the 8-year-old finally receiving a well-fitting and functional device during a three-day visit to the Utah facility.

When Lucas tried out his prosthesis, comprising a self-suspending socket, a prosthetic forearm and wrist, cable and harness, and multiple terminal devices, he was able to stack blocks, grasp a snowball, and play alongside his twin sister. “It was the first time he was able to reliably hold things with that side of

his body,” explains prosthetist Chris Baschuk, MPO, CPO, FAAOP(D), a regional clinic manager at

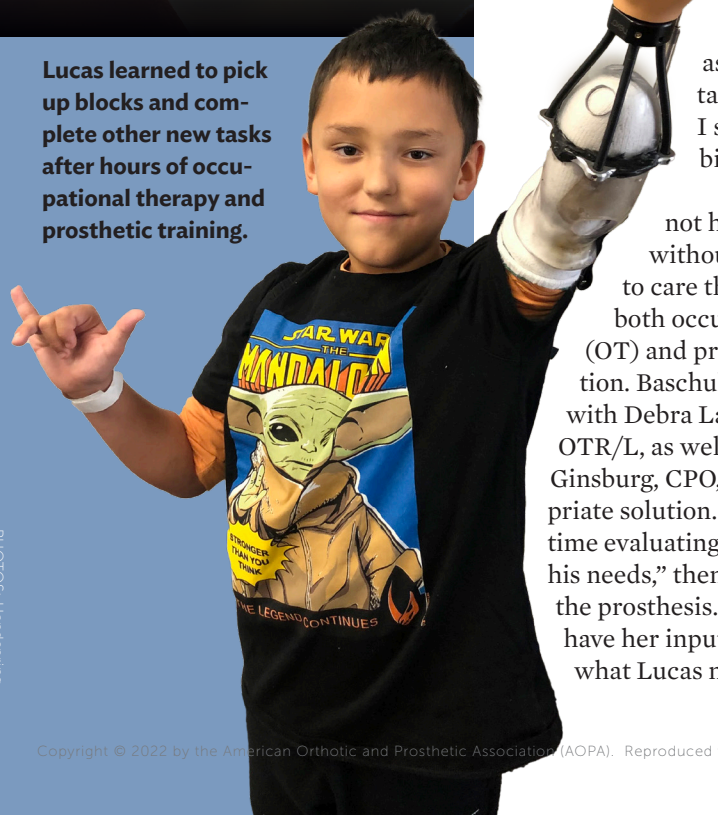
Handspring. “Lucas asked me, ‘Do I get to take this home?’ When I said ‘yes,’ I got the biggest hug!”

This success would not have been possible without a team approach to care that prioritized both occupational therapy (OT) and prosthetic innovation. Baschuk worked closely with Debra Latour, OTD, MED, OTR/L, as well as prosthetist Amy Ginsburg, CPO, to design an appropriate solution. “Debi spent a lot of time evaluating him and establishing his needs,” then preparing him for the prosthesis. “It was critical to have her input” to understand what Lucas needed in a prosthesis



Chris Baschuk, MPO, CPO, FAAOP(D), fit 8-year-old Lucas with a prosthesis after multiple sessions with an occupational therapist.

Lucas learned to pick up blocks and complete other new tasks after hours of occupational therapy and prosthetic training.



to function in his natural environment. During OT evaluations, Latour “sees things I don’t necessarily see,” Baschuk says. Lucas’s positive outcome came about “because we were all working as a team.”

Early Intervention

Upper-limb prosthetists say that working closely with occupational therapists is key to successful patient outcomes. Baschuk notes that such cooperation is necessary to validate the functionality and design of the prosthesis.

An effective OT who is experienced in amputation teaches patients not only how and when to use a prosthesis, but also which device is appropriate for specific tasks. “The OT helps them learn to integrate the prosthesis into their life, and works closely with the prosthetist to explain areas of deficit so that the prosthetist can properly adjust the device,” Baschuk says.

Rob Wagner, CP, an upper-extremity specialist at Wright & Filippis, emphasizes the value of OT intervention both prior to and after a patient receives a prosthesis. Whether a patient is fit with a body- or electric-powered upper-extremity prosthesis, “we want the OT to work with the patient before receiving the device so they can improve their range of motion, to strengthen the flexors and extensors, so they’ll be able to use the device” once it is delivered, says Wagner.

At Arm Dynamics centers, the prosthetist-OT collaboration “happens right at the beginning, and goes right to the end—lifelong care,” says Kerstin Baun, MPH, OTR/L, national director of therapeutic services. “It’s so important that the initial evaluation is collaborative because you’re really getting at: What is important to this person? What will matter to them at the end?” The answers to those questions will enable the team to select and fit an optimal prosthetic solution, and develop a plan of care that facilitates the patient to succeed in using the device.

John Miguelez, CP, FAAOP(D), president and senior clinical director at Arm Dynamics, equates collaborative care between a prosthetist and an OT with a relay race: “There are times when we’re both holding onto the baton, and there are times when we’re

passing it back and forth,” he explains. “You’re maximizing the patient’s time and making sure that you identify

potential barriers that could arise, and dealing with those proactively so there aren’t delays in the rehabilitation of the patient.”

The initial evaluations enable the prosthetist and OT to assess the patient’s physical limitations and capabilities and assess range of

motion, strength, edema, scar management, and other factors that inform a successful fitting process, according to Baun. Arm Dynamics OTs also assess the patient’s social and psychosocial needs—“the mental health and well-being,” she says. “You’re dealing with the physical pieces, but you’re also paying attention to what’s going on for them socially—do they have the resources they need, and if not, can I help facilitate getting those in place? The same goes for mental health needs.”



Rob Wagner, CP



John Miguelez, CP, FAAOP(D)



Kerstin Baun, MPH, OTR/L

Individualized Care

After initial evaluations, individualized OT sessions prepare the patient for successful use with the prosthesis, according to Baun. OTs usually start with education—about the prosthesis, how to care

for it, and how to care for the residual limb—before moving on to the basics of component operation, and donning and doffing independently.

As a next step, therapists may ask patients to perform rote, simple actions. “We start with a simple task, and as the individual shows control and skill, we can grade to more complex activities,” explains Baun. Early tasks may include holding a

water bottle and learning to drink from it, or cutting food with a fork and knife. “Once those skills are mastered, we can shift to more complex activities—preparing a meal, or looking at tasks to enable return to work.”

Teaching patients to perform increasingly complex tasks can help prevent prosthesis abandonment, according to Wagner. “You can make a great prosthesis, but if the patient doesn’t understand how to functionally use it, they *won’t* use it,” he says. “When OT shows them how to carry out daily activities using a prosthesis—like folding clothes or opening a bag of chips—they want to use their devices.”

The type of upper-extremity device a patient receives affects the amount and the type of therapy needed, according to Baun. Even patients with less complex devices, such as custom silicone restorations, benefit from working with an OT, but therapy will be more intense for individuals with more advanced components. “A fully electric prosthesis is going to require programming; it’s going to require learning to control the various components of the device, learning how to preposition it, and how to optimize the function of it. That often requires collaborative problem-solving and lots of practice.”

The patient and their demeanor also influence the therapy plan. “We could have two patients with the same level of amputation, being fit with essentially the same prosthetic device, that need two completely different amounts and types of therapy,” Miguelez explains. “Part of the art is to understand what will work best for each patient’s personality and preferred learning mechanism.”

Many prosthetists attend some OT appointments to get a better understanding of the patient and their needs, says Baschuk. “I like to get involved in at least one or two OT appointments, both before and after delivery, to

validate that the design of the prosthesis is meeting the functional needs of the patient,” he says. “Sometimes the initial plan you thought would work” for a particular patient doesn’t progress as hoped. “It’s an iterative process. You use the device in training sessions with the OT, then deliver the prosthesis, then transition into the maintenance phase,” he says. “The patient may come back as they get used to the device and try to do more with their prosthesis than they originally

thought they could,” which may require device adjustments and well as more therapy.

For O&P facilities that don’t have OTs on staff, prosthetists may need to travel to participate in OT sessions with patients. At Wright & Filippis, Wagner travels throughout the state of Michigan to treat patients, and he has developed relationships with OTs in different regions. “There are not a lot of upper-limb patients, so it’s good to stick with one OT [in an area] so they

can build up their experience” working with this select patient base, he says.

Wagner also lends equipment to OTs to facilitate more productive therapy sessions. For example, for myoelectric devices, he loans a tester, or he sets up a hand (without a socket) with a few electrodes so the patient can practice before prosthesis delivery. Working with feedback machines allows the OT and patient to see EMG signals as the patient moves. For some myoelectric devices, he introduces



Debra Latour, OTD, MEd, OTR

What an Experienced Occupational Therapist Wants You To Know

Debra Latour, OTD, MEd, OTR, is an occupational therapist, the doctoral capstone coordinator and a professor of occupational therapy (OT) at Western New England University, and a consumer of upper-limb prosthetics. Born with right upper-limb absence in 1956, Latour became a prosthesis user at 14 months old in an innovative program at Shriners Hospitals for Children in Springfield, Massachusetts. As a trailblazer, she became a prolific prosthesis user—despite having never participated in OT herself.

In high school, she learned about the OT profession and decided to pursue a career in the field. She earned a bachelor’s degree in occupational therapy, embraced clinical roles, and eventually earned master’s and doctorate degrees and university positions. In addition to serving as a clinical therapy consultant at Handspring, she also teaches upper-extremity courses for OTs and physical therapists, has authored multiple textbook chapters, and consults to Fillauer-TRS Inc.

Given her experience, Latour offers the following advice to prosthetists who treat upper-limb patients:

- **Embrace collaborative care.** Prosthetists should work with OTs and other members of the rehab team to share knowledge and provide overlapping—rather than siloed—patient care.
- **Ensure that all persons with upper-extremity absence have access to OT care.** Even individuals using passive and body-powered components can improve their outcomes when they take part in OT.
- **Encourage clients to participate in preprosthetic training.** Individuals can get started using simulators and other training devices when working with OTs, even before their prostheses are ready. “They’ll start to train their minds on how to use their prostheses, and will be more comfortable once they get their devices,” Latour says.
- **Focus on communication skills.** Recognize that other members of the healthcare team—and the device users themselves—may not understand or feel comfortable with some of the terminology prosthetists use. Embrace person-first language, and avoid technical terms.
- **Help train OTs in prosthetic subspecialties.** There are more than 80,000 OTs in the United States, but specialized training specific to limb loss is hard to access, says Latour. Prosthetists can raise awareness of the profession and the need for OTs with expertise in upper-limb loss/absence, and offer training courses to area OT professionals.

software that trains the patient via video games—directing cars through a maze, or opening and closing a hand. “Then they’re more prepared to practice ADLs after they receive their device,” Wagner says.

Taking Field Trips

In addition to teaching “skills drills,” OTs consider the environments in which clients will be using their devices. “An OT will take the time to figure out specific activities—those most meaningful—they want to be able to accomplish,” says Latour.

Occupational therapy plays an important role in ensuring the prosthesis design and rehabilitation plan addresses patient’s individual concerns, says Latour. “OT looks beyond limb loss to the total person, and helps people find their voice,” she explains. “We can learn what is troubling them, and in what environments they find themselves. We discuss intimate topics such as how they dress, grooming, toileting, and relationships with spouses. They are much more open to talking to OT about these topics—and we can bring back the relevant information to the prosthetist.”

At Arm Dynamics, OTs work with patients at locations where they will most benefit from using their devices. “It’s one thing to be successful in the clinic, but when you add the physical uniqueness of different environments, and the social challenges of having people look at you, it really changes the demands of the task,” explains Baun. “It adds psychosocial layers, and complexity.”

Home visits, for instance, can yield positive results. In addition to evaluating how the patient can use their device and how much support they have at home, the OT can recommend modifications to the patient’s home or specific external devices to accomplish different tasks, “well beyond the scope of the prosthetist,” says Baschuk.

Many OTs also accompany patients as they engage in community activities, according to Miguelez—for example, visiting the grocery store to teach



John Miguelez, CP, FAAOP(D), works with a patient on activating grip patterns with his multiarticulating hand.

patients how to grab items to place in their carts and pay for purchases. The OT’s role is “to be there and support them, and note the things they did really well, and the activities that were more difficult—then spend more time perfecting control through training, so the patient feels confident in any environment,” he says.

In-person worksite evaluations also can be informative. Baun frequently goes with patients to their workplaces—offices, factories, and even construction sites—to understand the physical tasks involved in their jobs. “Helping them problem-solve in the ‘here and now’ is hugely beneficial. It helps them get to that next level, and helps them problem-solve through challenges.” She also accompanies patients to physical activities, such as going to the gym, paddle-boarding, or rock-climbing—where she can assess whether they have appropriate activity-specific componentry. “We can take that information back to the prosthetist,” who can make changes

and adjustments, Baun explains.

All of these field visits help boost patients’ confidence—which can prevent prosthesis abandonment, according to Miguelez. “We want our patients to continue to wear their prostheses, so anything we can do to lower or eliminate the potential for abandonment is really important,” he explains.

Even after patients have received their definitive devices and are satisfied with their function, collaborative follow-up is beneficial. Patients at Arm Dynamics complete a short survey every three months to ensure they are still on track in their rehabilitation journey. The data they provide helps identify lapses or reduced prosthesis use—“we can ask them to come in so we can talk about it and address any issues,” says Miguelez. “Sometimes it’s as simple as they’ve taken up a new hobby, and they were never trained with their prosthesis in that activity—so we have them come in and work with their therapist. That can mean a huge change in quality of life.”

Measurement Tools Inform Upper-Limb Care Plans



Kerstin Baun, MPH, OTR/L, guides a patient through a series of basic functional tasks.

Outcome measures can be just as important for upper-limb patients as they are for lower-limb patients. At Arm Dynamics, occupational therapists and prosthetists work closely to capture and analyze patient data. For example, the team leverages the Wellness Inventory during patients' initial evaluations, explains Kerstin Baun, MPH, OTR/L, national director of therapeutic services.

The Wellness Inventory is a patient screening tool that helps identify psychosocial changes that could have a negative impact on rehabilitation or success with the prosthesis, and screens for issues such as substance use, pain, PTSD, depression, and other quality-of-life issues. "A lot of these patients sustain their amputations as a result of an accident, so many have post-traumatic

anxiety or depression," says Baun. In fact, Arm Dynamics' research in studying Wellness Inventory responses has found that 58% of patients screen positive for depression and/or post-traumatic anxiety.

Baun says it's also common for patients to screen positive for substance use, which can be a coping mechanism postamputation. "We want to make sure they're shifting to positive coping mechanisms" by helping to find and put in place the support and resources they need, Baun says.

"The Wellness Inventory informs our whole approach" and is given to patients more than once, Baun says. After patients become comfortable with their prostheses, "we touch base with them again, using that exact same inventory, to learn what's changed, what's been resolved, and what may still need attention."

Clinicians at Arm Dynamics also leverage other measurement tools, such as a performance measure called the Capacity Assessment of Prosthetic Performance for the Upper Limb (CAPPFUL™) and Comprehensive Arm Prosthesis and Rehabilitation Outcomes Questionnaire (CAPROQ™), a patient-reported outcome measure. "We use these at multiple time points to tap into both objective and subjective data; how well they are able to use their prosthesis, as well as their perceived function and satisfaction with their device, along with various elements of pain," says Baun. "It's so critical to look at it long-term, to ensure they're successful not only in the clinic, but in real life settings—that is the essence of lifelong care and the goal of occupational therapy."

Treating Pain

Collaborating with OTs adds value when working with limb loss patients who experience pain, according to Baschuk. “If they say their shoulder, or arm, or other side of their body hurts, the OT can usually watch and figure out why” the pain is occurring, then assist in devising a plan to prevent or reduce that pain.

Latour says OTs also may uncover information that patients did not realize was relevant to share with their prosthetists—such as previous sound-side injuries that still bother them. Sometimes OTs can help explain problems patients encounter with new devices: “Prosthetists take pride in their end product,” she explains, “so some people are afraid to speak up if there is a problem.” But they may feel comfortable sharing that information during therapy—and OTs can serve as a bridge to the prosthetist. “We teach our clients self-advocacy.”

At Arm Dynamics, clinicians screen patients for pain at initial evaluations and periodically thereafter, says Baun. Pain can run the gamut from residual limb pain, to phantom pain, to general body pain that may have been preexisting or was caused by the accident that resulted in the amputation. How the care team proceeds with patients who screen positive depends on the etiology. “For someone who has phantom limb pain, we would want to work collaboratively with their physician to make sure they have the medication they need, and may connect them with a counselor to help deal with trauma,” Baun explains.

OTs also may implement pain management strategies, such as graded motor imagery—therapy using specific imagery to train the brain away from pain—and mirror therapy, or other pain management techniques, according to Baun. “It depends on the individual therapist and their training,” she says. “Arm Dynamics therapists are trained in using modalities, which usually focus on residual limb pain, and pain that’s more peripheral. Regardless

of etiology, they may be helping the patient consider a lifestyle approach to pain management,” which could involve nutrition, exercise, meditation, and even sleep hygiene.

“Sometimes, as people become more functional with their prosthesis, and as the rehabilitation process continues, pain diminishes over time as life normalizes for them,” adds Baun. But for others, consultation with a surgeon may be advised. “If pain persists, we can speak to patients about the potential of surgery—for example, targeted muscle reinnervation for treatment of neuromas. OTs can facilitate a team approach to find solutions to persistent pain problems.”

Expanding Partnerships

To provide optimal patient care, prosthetists work not only with OTs but

also with other members of a rehabilitation team, which may include a surgeon, physiatrist, case worker, psychologist, physical therapist, and massage therapist, says Baschuk. “For upper-limb care, it’s a multifaceted challenge,” he explains. “Everyone on the team needs to know the goal and consider the ramifications across those specialties.”

Ultimately, collaborative care will help ensure patients’ needs are met. With a team approach, “the patient feels they have people in their corner who will go to bat for them,” Baschuk adds. “Each of us on the rehab team can help empower them from a different angle. It’s a really rewarding experience when we all work together.” **CP**

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Rob Wagner, CP, visits OT facilities to work with the therapist and patient together, and sometimes lends equipment to OTs to facilitate more productive therapy sessions.