



## Park Project

Oregon prosthetist helped return a tree feller—and transhumeral amputee—to his job at Yosemite



MacJulian "Mac"  
Lang, CPO, FAAOP

---

In each issue of *O&P Almanac*, the *Transformations* column features the success story of an O&P clinician who has worked with an inspiring or challenging patient. This month, we speak with MacJulian "Mac" Lang, CPO, FAAOP, who helped Austin Anderson return to his job as a tree feller.

---

**M**acJulian "Mac" Lang, CPO, FAAOP, never imagined he'd need to transport a tree trunk to the parking lot of his patient-care center in Portland, Oregon. But that's exactly what happened after he began working with Austin Anderson, a tree feller at Yosemite National Park, who needed a safe and effective above-the-elbow prosthesis.

Anderson used the tree trunk to test the device Lang created to enable him to use a chain saw and return to work.

Anderson had come to Lang for assistance after being turned away by two other prosthetists who practiced closer to his home in eastern central California. A few months after landing his "dream job" at Yosemite, Anderson was injured while

helping a friend cut down a tree; he ended up with a partially severed left arm, which eventually had to be amputated above the elbow.

Anderson loves the great outdoors and enjoyed his highly physical job as a tree feller, so his highest priority when researching prosthetic facilities was to find a clinician who could help him get back to operating a chain saw safely. After the prosthetists he saw in California indicated they couldn't help him meet that goal, Anderson sought out Lang, clinical manager at Arm Dynamics' Northwest Center of Excellence in Oregon.

### Prepared for the Challenge

In many ways, Lang was the perfect prosthetist to assist Anderson in his quest for an appropriate transhumeral prosthesis. Lang graduated from Cornell University with a bachelor's degree in mechanical and aerospace engineering, and worked as an O&P technician before attending the O&P program at California State University, Dominguez Hills. During his first few years treating prosthetic patients, he started to develop an upper-limb specialty—but he saw relatively few upper-limb patients because that population is much smaller than the lower-limb population.

Then Lang began working at Arm Dynamics, which specializes exclusively in upper-limb prosthetic rehabilitation. He was one of the prosthetists who treated service members and veterans under a contract with Walter Reed National Military Medical Center. In doing so, he gained an immense amount of experience working with combat-wounded service members—individuals who were generally young, physically active, and highly motivated. "That changed how I viewed prosthetics and what was possible in returning to function," Lang says. Many of those patients "pushed boundaries" and sought durable, creative, highly functional solutions.

By the time Anderson entered his facility, Lang and his team had become known for "pushing the envelope" to create individualized solutions that allow patients to return to activities they love. "We practice team care," says Lang. "A prosthetist, technician, and clinical therapy specialist work together to address the patient's needs." He and



Austin Anderson sought a transhumeral prosthesis that would not only enable him to run a chain saw, but also to traverse Yosemite National Park on foot or by donkey.

technician Cullen Hays have collaborated on the design, fabrication, and customization of every prosthesis since the center opened in 2008.

Upon meeting Anderson, Lang and his team noted several challenges in designing an appropriate device. First, Anderson had a very long transhumeral presentation. "This is challenging for fitting, because of lack of condyles needed for a supracondylar suction suspension that you can get really creative with," he explains.

Second, Anderson needed a prosthesis that would allow him to work a heavy chain saw safely, engage in other heavy lifting and physical movements while on the job, carry all of his equipment, and even ride a donkey.

Fortunately, Anderson was "eager and motivated" to get back to work, says Lang. During the initial evaluation, Anderson described how he would need to be able to use the prosthesis on his left side to grab and stabilize the saw while using his right arm to run the trigger; he also needed to be able to drop and release the chain saw very quickly in case a tree fell unexpectedly. Lang also considered that Anderson would

be wearing the prosthesis between 12 and 16 hours per day, and would be hiking up to 10 miles a day in the woods while wearing the prosthesis.

Lang, who grew up in Alaska, says, "I knew how to run a chain saw—but I had never felled a big tree." So, he did some research and discovered that several adapters had already been developed to use with chain saws. However, the available versions were either physical attachments to the chain saw or designed in such a way that it takes too long to detach the chain saw from the prosthesis. "Cutting down dead wood on trees that can be rotten" can be a potentially deadly situation if a chain saw gets pinched or trapped by the weight of a tree, explains Lang. "Safety is paramount," so he needed to get creative with a quick-release feature that would allow Anderson to disengage and run away from a falling tree without hesitation.

After many hours above-and-beyond what might be expected in typical prosthetic patient care, and "a lot of iterations, prototyping, and improvements," Lang and Hays designed an above-the-elbow body-powered prosthesis, with a Vari-Pinch

Prehensor hook (V2P) from ToughWare and a custom chain saw adapter. A JAWS terminal device from TRS was added later. Those components were paired with a roll-on silicone liner to help with suspension. Finding the right components, which were strong and quick-release, “allowed us to be confident and aggressive in our treatment,” says Lang.

Describing the final version of the prosthesis, Lang notes it includes a “big trigger on the back that can immediately disengage. We refined the terminal device a lot to make sure it really meets his needs.”

Lang and his team spent many hours working with Anderson both inside the center—carrying heavy weights with the prosthesis to prepare him for work at the park—and outside in the parking lot, using the prosthesis to practice holding a chain saw and cutting through a tree trunk. “We made sure he was prepared” for the many challenges associated with the work responsibilities of a tree feller at a national park.

Using his new prosthesis, Anderson was able to return to his job, “living the dream” in Yosemite as one of only two tree fellers. “Now I’m capable of safely running a chain saw to continue to do what I love,” says Anderson. “This is only because I had a team who supported me and created the right prosthesis for my arm.”

But Anderson’s story doesn’t stop there. He recently left his job at Yosemite to become a certified arborist, where he continues to use his prosthesis and chain saw. He has a primary prosthesis as well as a backup, older version to use in case the primary is in need of repair. “If he absolutely needs his prosthesis for work, it’s unrealistic to think he won’t need a backup on occasion,” explains Lang. The prosthetic care team trained Anderson to do minor repairs on the device. “If he’s on a 10-mile hike from his car and a cable breaks,” he can fix it himself.

### Quality Care, High Confidence

Lang is glad he was able to help Anderson return to function and return to the work he loves so that he can earn a living. He believes Anderson made the right choice to seek out a provider who specializes in upper-limb care, especially as he had such



MacJulian “Mac” Lang, CPO, FAAOP, and technician Cullen Hays designed an above-elbow body-powered prosthesis with a quick-release feature to allow Anderson to disengage quickly.

a specific—and potentially risky—need.

“It’s a scary thing to provide someone with a prosthesis that allows them to do something dangerous,” says Lang. “If you’re not confident” as a prosthetist in treating such a unique patient, “then you shouldn’t do it.” Because Lang’s facility is laser-focused on upper-limb prosthetic solutions, he and his team were able to find the right solution. “Our patients have high expectations. Patients challenge us because they expect more. Sometimes we have unique design challenges—but we can design, prototype, and work with manufacturers to come up with solutions,” he adds. “That’s the fun part of prosthetics.”

Lang and his team also invest time and resources to help ensure patients continue to wear their devices. Within the upper-limb prosthetic patient population, prosthetic abandonment can be a problem, with many patients deciding not to use their devices. “We can’t ensure someone wears their prosthesis,” Lang acknowledges, but he believes that designing patient-specific solutions facilitates patients wanting to use their customized devices.

When it comes to getting prosthetic care approved by payors, the team at Lang’s center works closely with Arm Dynamics’ national justification and authorization team. They encourage patients to become self-advocates by speaking directly to their insurance providers about why they need a specific sort of prosthesis. The reality is

that O&P patient care requires that both healthcare professionals and their patients advocate for their needs, according to Lang. This is an important endeavor, he says, because many patients need their prostheses to return to work. For example, “if we couldn’t provide [Anderson] with a prosthesis that returned him back to work,” then he wouldn’t be able to provide for himself, says Lang. “So, we need to teach patients to advocate for themselves with insurers and to get referring physicians to help advocate for the device that’s recommended.

“The resilience of patients is a huge factor in how successful they will be,” adds Lang. “Patients that are dogged and that advocate for themselves, patients who want second opinions, that have a drive to make things work—that’s all a huge part of their success.”

Lang says his experience working with Anderson was truly transformational. “He really wanted to go back to work because he loved it,” says Lang. “There was immediate gratification to provide him with a prosthetic solution—and a clear indication of the impact of our care.” ✂



**DO YOU HAVE A TRANSFORMATIVE PATIENT-CARE EXPERIENCE YOU’D LIKE TO SHARE WITH O&P ALMANAC READERS?** Contact Editor Josephine Rossi, [jrossi@contentcommunicators.com](mailto:jrossi@contentcommunicators.com), with your story to be considered for an upcoming profile.