

2011: YEAR IN REVIEW

DAYTON ARTIFICIAL LIMB

Lower Extremity Specialists

Three years of R&D produce a breakthrough for Trotwood bowler in 2011

‘I walk a whole lot better’

Don McElroy, 52, of Trotwood, barely remembers life without an artificial left leg – he’s had one since age 5. But in 2008 he told his prosthetist, Tracy Slemker of Dayton Artificial Limb Clinic, that walking long distances was getting tougher.

“Fatigue hits, and I have to rest,” Don said. “It just takes more energy to move that left leg.”

That’s a problem for Don, who plays tennis and basketball, rides a stationary bike, and takes on yard work and house projects. Plus, he’s a serious bowler.

“I have always competed with the best of the bowlers,” said Don, who’s shot 28 perfect games “and six 800 series, with 877 my highest.” That score is close to a perfect 900 series – three perfect games in a row.

So the clinic and its sister company, Prosthetic Design, Inc. (PDI) of Clayton, began research and development (R&D) on a new prosthesis for Don. He’s among the world’s most difficult patients to fit, Tracy said, since his amputation was performed on an atypically shaped limb because of a congenital condition also affecting his hip joint and surrounding muscles.

“Improvements came in small bits and pieces and accumulated into something much bigger,” Tracy said. “You don’t fit a patient like Donny off the shelf. Everything was custom.”

Staff marveled at Don’s patience. “He never once got frustrated,” said Rob Hoskins, the prosthetic engineer and clinical consultant handling the parts fabrication, working closely with PDI staff.

Finally – after 150 appointments; hundreds of liners, seals and socket iterations; and almost 50 people working on the solution – a breakthrough came in 2011.

“I walk a whole lot better in this new one – the dip on my left side is just about gone. I don’t feel like I exert as much energy to walk. And the cosmetics and appearance? They play a big part,” said Don, who had to wear a belt with his old prosthesis. “Now I can walk down inclines without it catching, and there are more safety features.”

His innovative prosthesis works with elevated vacuum at a low pressure without a lock, Rob said. Final socket modifications are under way, and Don is looking forward to wearing his new prosthesis soon.

Tracy said typical prosthetic patients – those with diabetes, heart conditions or kidney disease – don’t take three years to



Right-handed Don McElroy slides on his right leg since he has an artificial left leg. His new prosthesis will make bowling more comfortable, he says.

fit, but they will benefit from all the R&D that went into Don’s prosthesis. A report on his case will run in the March 2012 issue of *The O&P EDGE*, an industry publication.

“I know all this is going to help others in the long run,” Don said. “If they can fit me, they can pretty much fit anybody.”



Luci Busch, Certified Prosthetist, meets with patient Sheila Wilkinson in her Middletown home to adjust her prosthesis.

Prosthetic mobile lab logs 8,500 miles in 2011 House calls meet patients’ needs for fittings, adjustments

Dayton Artificial Limb Clinic’s mobile lab is a rolling workshop with all the tools, parts, components, materials and a workstation needed to make prosthetic fittings and adjustments. There is no extra charge for this service.

“Patients sometimes have transportation problems, and we can improve their outcomes by going to their homes,” said Certified Prosthetist Luci Busch. “They can try things out in their own surroundings: on carpet, linoleum and steps. It helps us move our patients forward.”



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There's a trust that we will do the right thing

by Tracy Slemker, CPO

Back in 1996, when I was working as a prosthetist in Columbus, I started getting calls from orthopedic surgeons in Dayton complaining, "We're having a lot of problems getting our amputees taken care of – can you start a practice here?" So I created Dayton Artificial Limb Clinic.



The technology changes back then were amazing – computer-aided design, silicone liners and carbon feet were all new. I jumped in and began working with a team to design and quickly manufacture parts that ultimately worked better for our patients.

We have built the practice by taking really good care of our patients – making sure everything fits and works well. We have managed our patients with a team approach, taking personal responsibility to connect them with specialists to care for their neuromas, back pain and other issues that no prosthetist can address. And we have always helped them get the best possible physical therapy to ensure the best possible outcome.

Every day we receive another referral, my thought is exactly the same: It's an honor to care for patients who are amputees – to get them feeling somewhat whole again. After all, to walk again – even to stand again if you have been sitting in a wheelchair for a very long time – is a big deal.

There's a trust that we will do the right thing. And that is our challenge as prosthetists:

- What are all the little things we can do that will accumulate as an improvement?
- How can we keep the momentum going so that having a prosthesis isn't a huge interruption or a weak link in any patient's life?
- What can we do to make our patients a little bit healthier or buy them more time?

In 2012 and beyond, that will continue to be our challenge as innovative caregivers at Dayton Artificial Limb Clinic.

Tracy Slemker is a Certified Orthotist/Prosthetist; Ohio-Licensed Orthotist-Prosthetist; Fellow of the American Academy of Orthotists and Prosthetists; and the president and founder of Dayton Artificial Limb Clinic, Prosthetic Design, Inc., Dayton Physical Therapy and Montgomery Motorsports.

Dayton Artificial Limb Clinic celebrates 15th anniversary Milestones mark organization's growth (1996–2011)

2009: First workshop for the Elevated Vacuum Locking System (EVLS®) is held at the clinic, which helped advance the technology. Practitioners nationwide attend.

2006: The clinic is accredited by the National Commission on Orthotic and Prosthetic Education to educate prosthetic residents.

1996: Computer-aided design (CAD) software is used to create socket shapes for patients at the clinic. (A socket attaches to a residual limb.)

2011

2010: A co-op program is established with local universities.

2007: Both offices begin offering physical therapy; therapists and prosthetists collaborate to expedite and improve patient outcomes.

2001: Dayton office expands; Beavercreek office opens. The clinic is the world's first to create, manufacture and fit Below Knee By Measurement sockets successfully, streamlining the measurement process for practitioners. A patent is awarded.

1998: CAD software is used exclusively to create sockets for above- and below-the-knee amputees, making the clinic a virtually plaster-free facility.

1996



Celebrating 15 years of serving patients is the staff at Dayton Artificial Limb Clinic (from left): Rob Hoskins, prosthetic engineer and clinical consultant; Andrea Kinsinger, physical therapist; Maggie Washburn, Certified Prosthetic Assistant; Tracy Slemker, Certified Orthotist/Prosthetist and the president and founder; Luci Busch, Certified Prosthetist and senior director of clinical services; Ian Davis, Certified Prosthetic Assistant; and Brad Poziembo, prosthetic resident.

Prosthetic resident shares invention with national audience Valve regulates vacuum pressure, solves pain problems

Amidst 250 practitioners, Brad Poziembo described how he designed and manufactured a valve that regulates vacuum pressure to relieve pain some patients feel when being fitted with a mechanical vacuum pump. Brad, a prosthetic resident at Dayton Artificial Limb Clinic, presented his invention in September 2011 at the American Orthotic & Prosthetic Association National Assembly in Las Vegas.

"People came up afterward and said they had this problem when fitting patients with this type of prosthesis, so they gave up," Brad said.

His presentation was intended to convince practitioners to use elevated vacuum technology because of its advantages to patients: better wound healing and more mobility, control and comfort.

"Prosthetists might shy away from elevated vacuum if their patient has discomfort during a fitting – but if we attach a valve and regulate the pressure, patients can wear the prosthetic until we can get them a new socket or the limb acclimates to increased pressure," Brad explained.

The valve, which took six months to develop, will allow even more patients to be fit with elevated vacuum, Brad said.



Brad Poziembo is a prosthetic resident at Dayton Artificial Limb Clinic.

Physical therapy at the clinic, new artificial legs in 2011 help woman walk for the first time in 22 years

Double amputee Linda Warrick, 62, beat the odds

When Linda Warrick learned her left leg had to be amputated in 2010 – she'd already lost her right leg in 1989 after an auto accident that crushed both legs – she panicked.

"I thought, 'How am I going to vacuum? Get on the toilet? Transfer into my chair? And I will never be able to drive,'" recalled Linda, 62, of Kettering, who'd never relied on a prosthesis.

Linda was right to be worried: Female double amputees age 60 or over are typically wheelchair-bound. But Linda is far from typical.

"She has natural strength and coordination, and she followed through – she did what she was instructed to do," said Melanie Welch, Linda's physical therapist.

Linda started at Dayton Artificial Limb Clinic with "stubbies" – short artificial legs – so she could learn to move safely, Melanie said. Soon she was ready to try longer artificial legs making her 5 feet 8 inches tall.

"I walked on them immediately," Linda said. "The only problem I had was getting up and down by myself to stand with my walker."

She worked hard at that – "some days I was depressed and didn't care to try," Linda admitted – and finally mastered it. Then she asked Melanie and others at the clinic about getting onto the ground so she could garden.

"We followed her lead and gave her the chance to say what she thought would work and didn't shoot down her dreams," Melanie said. "Her drive is unforgettable. She beat the odds."

Linda practiced at the clinic and at home so when spring came, she was ready. "When I was able to garden, I knew I could do just about anything," she said.



Thanks to physical therapy and encouragement from the staff at Dayton Artificial Limb Clinic, Linda Warrick of Kettering is able to cook and clean in her kitchen on her own.

She also exercises faithfully, doing strength training and walking vigorously for an hour each morning to keep her heart healthy. She's able to vacuum, cook and clean her kitchen – "I'm a stickler for housecleaning," Linda says – and she's already planning for petunias in her garden.

"Strangers will say, 'I can't believe you can even walk!' Linda said. "They think it's a miracle. But I couldn't have done it without all the help and encouragement from Dayton Artificial Limb Clinic. They have given me a normal life."

Co-op students like Erin Sutton advance R&D, help with patients

Erin Sutton, a senior from Perrysburg, Ohio, majoring in mechanical engineering at the University of Dayton, did co-op work at Dayton Artificial Limb Clinic and sister company Prosthetic Design, Inc. (PDI) of Clayton for three semesters, through August 2011. She's shown below in PDI's manufacturing lab using the Trautman grinder to customize the trim lines for a below-knee amputee socket.

At the clinic and PDI, Erin measured patients' progress using respected "objective assessment protocols," did prosthetic fittings and repairs, wrote and published four patient case reports, and learned about product development. She also improved a manufacturing machine to maximize a socket's material-thickness-to-strength ratio and to create a better socket surface.

"My experience here trained me to always think about the patient when I design something and to keep things simple," said Erin, who plans to earn a doctorate in biomedical engineering. "A lot of things may look good on the bench top but would not work well on a patient."

She also supervised 10 co-op students – even designing an employee orientation website – and created a project management system for 13 concurrent projects.

"She transformed our co-op program," said Tracy Slemker, president and founder of Dayton Artificial Limb Clinic and PDI, where more than 60 students have worked since he began the co-op and internship program in 2010.



Surgeons ask Dayton Artificial Limb Clinic to fit more patients with IPOPs

Temporary prosthesis after surgery gets patients functioning faster

Prosthetists at Dayton Artificial Limb Clinic fitted more patients with an IPOP – an immediate post-operative prosthesis – in 2011, according to Brad Poziembo, a prosthetic resident at the clinic.

"Without an IPOP, the patient is confined to a wheelchair for weeks or months while healing," Brad explained. "Patients with IPOPs have the potential to be standing and taking

steps the next day so they can become more independent."

An IPOP, a temporary prosthesis, is changed weekly until the patient is ready for a permanent device. IPOPs also protect the surgical area, let patients start rehab and physical therapy faster, promote blood circulation and healing, and help with the psychological aspects of an amputation, he said.

"When I fitted one patient with her final prosthesis out of an IPOP after six weeks, her physical therapist was shocked to see how functional she was so soon after the amputation," Brad said. "That is why we take the extra time to do it – because it benefits our patients."



Rob Hoskins, prosthetic engineer and clinical consultant at Dayton Artificial Limb Clinic, demonstrates how an IPOP is fitted after surgery.

53 practitioners nationwide attend 11 EVLS workshops at the clinic in 2011

Trainees from Massachusetts to Hawaii came to Dayton to learn how elevated vacuum could help their patients

Robert Mays of Missouri was looking forward to his trip to Ohio in October 2011 to learn about the Elevated Vacuum Locking System (EVLS®) in a workshop hosted at Dayton Artificial Limb Clinic and held by Prosthetic Design, Inc. (PDI), a sister company. EVLS is used in high or elevated vacuum socket systems, which connect to a patient's residual limb.

Robert thought EVLS might help a couple of his patients at Alpha-Omega Orthotics & Prosthetics in Springfield, Mo., who were no longer responding to standard treatment. And it did.

"It worked well on three patients right off the bat," said Robert, a Certified Prosthetic-Orthotic Assistant. "One patient in particular has better control of her limb, better healing, better tolerance and no issues with pressure throughout the day."

Six of his patients have benefited. "No one solution works for everyone, but this seems to be a good one for patients who have multiple issues," Robert said. "It almost becomes an extension of their limb."

Rob Hoskins is the prosthetic engineer and clinical consultant at Dayton Artificial Limb Clinic who helps teach the course for PDI. This Clayton-based company develops and refines the process of prosthetic manufacture, assembly and adjustability, often working with patients at the clinic. PDI and the clinic advanced EVLS technology.

"Our training helps practitioners learn how to fit patients with EVLS and improve their lives," Rob said. "The elevated vacuum socket

allows for a better fit so a patient's prosthesis moves with them."

The workshop covers materials and components; patient selection and evaluation; casting and fabrication; and best practices for fittings, modifications and troubleshooting. Attendees receive continuing education units.

"We're far more open to elevated vacuum now than we were going into the course,"



Rob Hoskins, prosthetic engineer and clinical consultant (standing), reviews material for the Elevated Vacuum Locking System training course.

Robert said. "I see us steadily introducing it as a standard of care rather than an ancillary solution."

Dayton Artificial Limb Clinic publishes case report in a peer-reviewed journal in 2011

Patient Allen Spoltman: 'It almost feels like a real leg'

A year after his left leg was fitted with an elevated vacuum prosthesis, farmer Allen Spoltman of Maria Stein, Ohio, said he could easily walk for several miles every day, do yard work, climb ladders, pivot to collect eggs in the chicken house, and get up and down from his combine – all without pain, skin irritation or exhaustion. "Everything is just so much easier," he said.

Allen was surprised at the changes. "Now if I step on something, there's more feeling in my foot," he said. "It almost feels like a real leg."

Allen, who lost his leg in a 1992 farming accident, transitioned from his bulky, traditional prosthesis after encouragement from the prosthetists at Dayton Artificial Limb Clinic in 2010.

"My gait and my walk are totally different," he said. "When I go places, people don't even realize I have a prosthetic. Now I treat it just like my other leg."

A report on Allen's case was published in October 2011 in the *Journal of Prosthetics and Orthotics (JPO)*, a leading peer-reviewed journal from the American Academy of Orthotists and Prosthetists.

"This was a radical change that stabilized Allen and really

improved his life," said Luci Busch, a Certified Prosthetist at Dayton Artificial Limb Clinic. "Our goal is to educate patients on new technologies so they have the best quality of life they're entitled to. That's why we do what we do."



Allen Spoltman can easily climb ladders and walk up and down steps with his elevated vacuum prosthesis. "There's really nothing I can't do," he says.

DAYTON ARTIFICIAL LIMB

Lower Extremity Specialists

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