



Noteworthy

Don't Fear the Research: Residency With Research Based Track

- Karl Barner, CPO/L—Residency Director—Children's Healthcare of Atlanta
- Leigh Davis, MSPO, CPO/L—Children's Healthcare of Atlanta

The Orthotic and Prosthetic profession has evolved into many pathways to practice including patient care, education, administration, engineering, and research. The current pathway for clinical education in the United States is a Master's of Prosthetics and Orthotics (MPO) or a Master of Science in Prosthetics and Orthotics (MSPO). New clinicians are also required to do a residency in each discipline and pass board exams to become nationally certified Orthotists and/or Prosthetists. Most professionals agree that the residency time is a continuation of the education. The National Commission of Orthotics and Prosthetics Education (NCOPE) structures residencies as either clinical track or research track. Clinical tracks are a terrific way for professionals that want to focus on providing optimal care for patients in their career. However, the research track provides opportunities to go beyond the patient care setting to promote the profession and the people that are served, quantitatively justify orthotic/ prosthetic needs to referral sources and payors, and to continue to practice the research skills learned in O&P school. **Read the full story on page 2.**

Retraining Yourself to Retrain Technicians 101

- Matthew Harris, CPO—Premier Bone & Joint Clinic—Laramie, WY

I can tell you from my own experience that a good technician is worth his or her weight in gold. And if you find a great technician, he or she should be adopted into your family. It is important to cross-train technicians, so they do not get burned out while doing the same thing repeatedly. My final piece of advice, talk with your technicians on a weekly basis. Thank them for their demanding work. We so often get the credit from the patient, but how many times have you said 'Well, it was a team effort. My tech, so and so, built the device and did an excellent job.' **Read the full story on page 5**

Amplant, Amplant....What is an Amplant?

- Tom Cutler, CPO—Limitless, LLC—California

The Amplant is an innovation that comes from not merely asking questions, but from thinking about and considering solutions. While the profession is often enthusiastic about collaboration, it is often too careful about peeking into another profession's lane to ask questions. Einstein said, "The important thing is to never stop questioning." The Amplant is a low profile osseointegrated (OI) bone cap that doesn't remove the IT band for "balance." Rather, this internal surgical implant goes in the other direction and harnesses more hip abduction power to support body weight for walking. **Read the full story on page 7**

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Don't Fear the Research: Residency with Research-Based Track

- By Karl Barner, CPO/ L, Residency Director
- Leigh Davis, MSPO, CPO/L

Children's Healthcare of Atlanta Orthotics and Prosthetics Department

Introduction

The Orthotic and Prosthetic profession has evolved into many pathways to practice including patient care, education, administration, engineering and research. The current pathway for clinical education in the United States is a Master's of Prosthetics and Orthotics (MPO) or a Master of Science in Prosthetics and Orthotics (MSPO). New clinicians are also required to do a residency in each discipline and pass board exams to become nationally certified Orthotists and/or Prosthetists. Most professionals agree that the residency time is a continuation of the education. The National Commission of Orthotics and Prosthetics Education (NCOPE) structures residencies as either clinical track or research track. Clinical tracks are a terrific way for those professionals that want to focus on providing optimal care for patients in their career. However, the research track provides opportunities to go beyond the patient care setting to promote the profession and the people that are served, quantitatively justify orthotic/ prosthetic needs to referral sources and payors, and to continue to practice the research skills learned in O&P school.

About the Author

Karl Barner, CPO is the Student Coordinator and Residency Director at the Children's Healthcare of Atlanta where he has been employed since 2007. Karl received his O&P education from the University of Washington in 1991 and was employed at Loma Linda University Medical Center for 13 years. While at Loma Linda, he was on the faculty at the school of medicine and also lectured in the PT and OT programs. Karl also was in private practice in Anchorage from 2004-2007 before joining Children's Healthcare in Atlanta.



History

Orthotic and Prosthetic [residencies](#) began in the late 1980s/ early 1990's. There were few true residency options, and the requirement to sit for board exams was 2000 hours experience per discipline. In 1992, [NCOPE](#) was formed to ensure educational programs met minimum quality standards¹. At that time the orthotics and prosthetic field [was](#) recognized as an allied health profession, and schools were encouraged to become approved by the Accreditation of Allied Health Education Programs (CAAHEP). In the late 1990's, there was a drive to increase true residency programs, which entailed 1 year of post-graduate training including specific experimental requirements and completion of a research project. In 2012, the option to complete a clinical track or research track was introduced by NCOPE.

“Residents should be encouraged to practice what they have learned and work with a research mentor during their residency. “

Research Basics

Research can be a lengthy and challenging proposition. As a result, many people might not want to consider research- based [residencies](#). However, research does not have to be scary. There are many resources to support residents and residency directors as they strive to contribute to the field through research. For example, residents may not know an appropriate research question to study immediately after completing a degree. Professionals at their residency site or in partnership with their residency site can provide suggestions. A residency research project may look to examine any of the following:

- Patient functional / Outcome measures
- Material science
- Professional demographic/ educational practices
- High quality literature reviews
- Patientcare/ Professional surveys
- Experimental design
- Business practices

Don't Fear the Research (Continued)

Additional arguments against conducting research during residency are insufficient time, lack of financial support and too few mentors². Although there are few Orthotists and Prosthetists that are full time researchers, university or institutional settings may have staff and tools to support studies, and a partnership between a researcher and a resident is almost always mutually beneficial. For a student interested in research, looking for a residency within or with ties to a university or institution may increase the support available during the year and likelihood of success.

About the Author

C. Leigh Davis, MSPO, CPO is an orthotist/prosthetist at Children's Healthcare of Atlanta. After receiving a Bachelor of Science in Mechanical Engineering from Auburn University, she attended the Georgia Institute of Technology for her Masters in Prosthetics & Orthotics. Following graduation, she completed her orthotics residency at the University of Michigan and her prosthetics residency at Atlantic Prosthetics & Orthotics in Chapel Hill, North Carolina. Leigh served as an American Academy of Orthotists & Prosthetists Board Member from 2012-2020 including serving as President 2018-2019. She is also a member of the Academy's State of the Science Program committee, the Diversity and Inclusion Advisory Panel, and a founding member of the Women in Orthotics and Prosthetics Committee. Leigh's clinical interests are in pediatric orthotics, particularly orthotic treatment of scoliosis. Outside of work, she enjoys spending time with her husband and three children. Her hobbies include running, cycling, and outdoor activities.



Research is now part of the curriculum in MSPO programs, and many require a research project. Residents should be encouraged to practice what they have learned and work with a research mentor during their residency. The advancement of P&O education and the profession requires professionals who are qualified and competent to conduct and lead research efforts (Spauling, et al). The mentor can help guide the resident through the processes at their facility. Other partners that can help assure a quality outcome are librarians for literature review, researchers, engineers, and statisticians.

Residents should also work with their mentor to define a project that can be completed in an appropriate timeline. This may mean a small portion of a research study rather than a start-to-finish project. For example, one resident could initiate a new study by writing a high-quality literature review. The next resident could write the protocol and seek Internal Review Board (IRB) approval. In the right situation, the next step may be grant proposals for funding. The project could then be completed by future residents, research partners, or staff clinicians. Identifying a manageable 1-year project is one key to individual resident success. Time needed to complete the project should be discussed and established with the mentor early in the residency.

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The Importance of Research

Research is essential for the survival of the profession of orthotics and prosthetics. Orthotists and Prosthetists are educated professionals who are increasingly relying on evidenced based practice to guide treatment interventions. Just as a team approach is essential for proper outcomes of a patient, likewise a team approach is optimal for orthotic and prosthetic research. The advancement of O&P education and the profession requires professionals who are qualified and competent to conduct and lead research efforts³. Research can help drive the best care for our patients and encourage insurance companies to cover devices for our patient's needs.

Not Everybody Hits a Homerun

Most clinicians who do research would ultimately like to see results that justify a treatment to be the best for a patient or advance the profession. Occasionally a hypothesis is disproven. This should not be viewed as failure, as even a disproven hypothesis provides more information, and creates more research questions. Ongoing efforts are necessary for continuous advancement.



Kinsey Herrin, MSPO, CPO working with Dr. Mark Geil, PhD on her orthotic residency research project studying toe-walking in children. (2011)

Don't Fear the Research (Continued)

Conclusion

Residency is the continuation of education and the start of a career. Students who have a hunger to answer clinical questions should consider a research track residency. Like previously stated, research projects do not have to be scary. With the right team, a research residency can fill in gaps in orthotic and prosthetic literature, advance our profession should not bring on fear and should enable a new graduate to apply what is learned and practice it. If you love research that is great, if you do not then you know that it is not right for you. Research projects can benefit the residency facility with exposure through publications and presentations, grant funding for ongoing projects and new partnerships with researchers and institutions across the country.

Ultimately, the profession - and most importantly our patients – benefit from evidence-based justification of the devices that we provide, and the knowledge to inform clinical decision making to assure the highest quality patient care.

¹Hovorka CF, Shurr DG, and Bozik DS. The concept of an entry-level interdisciplinary graduate degree preparing orthotists for the new millennium part: history of orthotic and prosthetic education. *J Prosthe Orthot* 2002; 14:51-58.

²Supan, TJ. Residency Research, Part 1: Why Should an Orthotic/ Prosthetic Resident Conduct Research?. *J Prosthe Orthot* 1995; Vol 7, number 4 142-146.

³Spaulding SE, Kheng S, Kapp S, Harte C. Education in prosthetic and orthotic training: Looking back 50 years and moving forward. *Prosthet Orthot Int.* 2020 Dec;44(6):416-426. doi: 10.1177/0309364620968644. Epub 2020 Nov 8. PMID: 33164659 Review.

OPRESCAS Updates

Remember that **all residency programs accredited or re-accredited after July 1, 2017 are required to advertise and accept residency program applications using the OPRESCAS WebAdMIT system.**



- Applications are only visible when the residency program staff submit a program configuration, which must be done **for each OPRESCAS cycle**, which runs from Sept through August of the follow calendar year.
- When a prospective resident applies with the OPRESCAS system, they are **provided a CAS-ID, which is needed for that individual to register for residency** if hired at a residency site.
- To learn more about how residency sites can best leverage OPRESCAS in their hiring practices, please visit: <https://oprescas.liaisoncas.org/>



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Retraining Yourself to Retrain Technicians 101

- By: Matthew Harris, CPO

After about a decade in the field of Prosthetics and Orthotics, I have had the opportunity and privilege of collaborating with a great many technicians. I can tell you from my own experience that a good technician is worth his or her weight in gold. And if you find a great technician, he or she should be adopted into your family.

The skill that these men and women show, not to mention their patience, is amazing. Whether you work with a C-Fab or have a tech or two in your own practice, having a dependable technician makes our jobs as practitioners much easier and allows our patients to receive much more quickly the devices they need. The question at hand is, how does one hold on to this highly skilled and patient technician? What actions or behaviors of ours drive them away?

How many times have we all placed an order in the lab, and it has come back not exactly like what we were looking for? It happens, and I think one thing we all need to remember is that all of us, clinicians and technicians, are human. The answer is not to go into the lab to belittle and scream at a tech alone or in front of colleagues. I have found that the best way to approach this kind of situation is to ask, "How can I mark this or label it so that it will be easy to read and understand and will not get missed in the future?" Knowing how to make the device yourself is critical. How can we expect our technicians to know how we want a device made if we are unclear in our instructions?

It is important to cross-train technicians, so they do not get burned out while doing the same thing repeatedly. By teaching each tech how to effectively complete each task, and then rotating the techs every 2-3 weeks or every couple of months, the tedious repetition is prevented. In addition, it helps the practice overall because if someone is out for vacation or illness, there is a trained and skilled technician who can complete the work and prevent a pileup.

Retraining Yourself to Retrain Technicians 101 (Continued)

My final piece of advice, talk with your technicians on a weekly basis. Thank them for their demanding work. We so often get the credit from the patient, but how many times have you said ‘Well, it was a team effort. My tech, so and so, built the device and did an excellent job.’ I like to tell my patients and have my techs know how much I appreciate the hard work and that it does not go unseen. In addition, I express to them how much the patient appreciates their work as well. Giving this feedback in front of colleagues is an especially effective form of compliment.

So, remember to be kind to your technicians. Remember that they are only human, even though sometimes we ask the superhuman of them. Teach them the skills and talents needed if they do not know what is expected. And be sure to always thank them for the challenging, difficult, and productive work. Do these things, and your technicians will be much more likely to work hard and stay with your company.



Caleb, Technician



Jason, Lead Technician



Smitty, 3rd Generation
Cobbler, & Business Owner



Terry, Technician

About the Author

Tom Cutler, CPO has been in clinical practice in Visalia, California since 2003. Through Limbitless, LLC, he has conducted patient care and developed innovation. In 2000, Tom received his Orthotics degree at Dominguez Hills and his Prosthetics degree at Northwestern in 2003. More than that, he is the father of two incredible boys and one very needy Manchester terrier.



“We so often get the credit from the patient, but how many times have you said “well it was a team effort. My tech, so and so built the device and did an excellent job.”

Amplant, Amplant, What is an Amplant?

• By: Tom Cutler, CPO

The Amplant is an innovation that comes from not merely asking questions, but from thinking about and considering solutions. It is an internal surgical implant suitable for every transfemoral amputee, but forces us to consider the accuracy of our assumptions about the very surgical foundation of our profession. In the world of O&P, we often promote the concept of innovation, but neglect to mention that the process of getting there is rarely achieved by asking permission. And, while our profession is often enthusiastic about collaboration, it is often overly careful about stepping into another profession’s lane to ask questions. Einstein said, “The important thing is to never stop questioning.” If your question makes people uncomfortable, is that not a sign that you are onto something?



The Amplant is a low profile osseointegrated (OI) bone cap. It restores stability, tissue health, and functional power. If this is an exciting solution, then what was the question? The question was, “Why are you removing muscles that amputees use to support their body weight?” From that one innocuous question, several innovations and discoveries have emerged.

Amplant, Amplant, What is an Amplant? (Continued)

One of these exciting discoveries is that there are several specialties which have historically avoided fundamental questions. While arteries were discovered in the 1600's, it seems like the worlds of vascular and orthopedic surgery would have discovered the primary source of blood for the longbones like the femur long before 2019. This happened with the research of Gruneboom and Kunzer <https://www.sci.news/medicine/trans-cortical-vessels-06839.html> and they are the transcortical vessels. When I emailed Dr. Kunzer to tell him that the medullary cavity of the femur was left open after transfemoral amputation, his response was "They must bleed like crazy!" The Amplant restores this intramedullary pressure.

Putting a bone cap on the distal femur does not simply restore the transcortical circulatory system to the femur, it also prevents the marrow contents from spilling out. And the loss of marrow, with an 85 percent composition of adipose cells, puts a compromised patient at risk for Fat Embolism Syndrome. In extreme cases, this risk can be fatal (Dixon, 2010) [https://](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3143953/)

www.ncbi.nlm.nih.gov/pmc/articles/PMC3143953/ but a recent meta-analysis (Finco, 2022) [https://](https://www.ismni.org/jmni/pdf/88/jmni_22_269.pdf) www.ismni.org/jmni/pdf/88/jmni_22_269.pdf shows that fat content jumps 7 percent in transfemoral amputees. And with a closer look, there is even more concern. The fat percentage jumps 4 percent in the intact thigh (compared to control subjects (29% to 33%), but in the amputated thigh the percentage has a threefold increase, reaching 42 percent. This means that not only will the Amplant preserve bone health, but the health of the surrounding soft tissue as well. And while one may claim, "It's never been a concern before", that isn't necessarily the case.



“For the students and residents reading this, it means that before you go out and demand answers, you need to know where you came from and how you got to this point.”



Amplant, Amplant, What is an Amplant? (Cont.)

Einstein said that having a philosophical and historical appreciation of our profession is what frees scientists from getting trapped in the “prejudice of their generation”. <https://www.pnas.org/doi/full/10.1073/pnas.1900357116>. With this in mind, we notice that in the Moore/Malone textbook "Amputation Surgery", Burgess included closure of the periosteum in the chapter that he authored on the subject. Without addressing it, this practice was abandoned by his successor, Dr. Gottschalk, who developed the adductor myodesis surgical technique. For the students and residents reading this, it means that before you go out and demand answers, you need to know where you came from and how you got to this point.

The Amplant device understands how the simple act of skeletal support can potentially benefit the prosthetist. Imagine more than twice the number of potential TF patients requiring only a third of the follow-up visits! Research shows that regular prosthetic use declines among transfemoral level amputees. AHRQ shows 5x higher levels of prosthesis abandonment in TF vs TT. Some researchers put dysvascular transfemoral prosthetic use at 20 percent or less <https://pubmed.ncbi.nlm.nih.gov/1393461/>. Now, the positive part of this argument. Forthcoming research on over one thousand amputees shows that careful partnering with vascular surgeons can reach ambulation rates of 65 percent when end-bearing is included of the nearly 2000 patients in the study. For residents still in school, you have yet to experience the frustration that comes from endlessly chasing atrophy in a socket that, just two days earlier, was fitting wonderfully. Can one imagine how full skeletal support for transfemoral amputees opens the door to a consistent fit and new socket design/innovation?

With investment and partnership from vascular surgeons, the Amplant is currently in development and shortly to be implanted in its initial clinical trials. Later iterations will provide additional hip power by harnessing the iliotibial band. But like clinicians tell their patients, “One step at a time.”



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