



Building Effective Partnerships Between Vascular Surgeons and Podiatrists in the Effective Management of Diabetic Foot Ulcers?

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Vascular surgeons and podiatrists both care for patients with diabetic foot ulcerations (DFUs). These patients represent one of today's most challenging healthcare populations in the U.S. The prevalence of DFUs has steadily increased along with the rising costs associated with care. Given the multiple comorbidities affecting these patients, a multidisciplinary approach is necessary in the management of these patients. Such efforts, primarily led by podiatrists and vascular surgeons, have been shown to effectively decrease major limb loss. Establishing an inter-professional partnership between vascular surgery and podiatry can lead to an improvement in the delivery of care and outcomes of this vulnerable patient population.<sup>i</sup>

This practice memo, a collaborative effort between the Young Physicians Programs of the American Podiatric Medical Association (APMA) and the Young Surgeons Committee of the Society for Vascular Surgery (SVS), is intended to aid podiatrists and vascular surgeons in the early years of their respective careers, especially those involved in the care of patients with DFUs. During these formative years, learning how to successfully establish an inter-professional partnership is crucial in order to provide the best possible care to this important patient population.

## Increasing Prevalence and Associated Costs

In 2007 the Centers for Disease Control and Prevention reported an estimated 24 million people in the U.S. were affected by diabetes, costing the healthcare system \$174 billion, of which \$116 billion were direct patient care costs. Peripheral vascular complications accounted for 31% of these expenses and were among the major contributors to inpatient length of stay, which is a strong predictor of increased cost of care. An analysis of Medicare claims data from 1995 to 1996 showed that expenditures for diabetic foot patients were three times higher than for the general population (\$15,309 vs. \$5,226). In one cost analysis, patients with DFUs healing without amputation averaged \$6,664 whereas patients healing by amputation averaged an expense of nearly seven times more at \$44,790.<sup>ii</sup>

There is a significant economic reduction of associated cost when the podiatrist and vascular surgeons are utilized in the goal of limb salvage and amputation prevention. Carls et. al demonstrated that podiatric physicians involved in the multidisciplinary approach of the diabetic foot reduces the economic burden by \$13,474 in patients covered by commercial plans and \$3,624 in Medicare covered patients.<sup>iii</sup>

## APMA and SVS Joint Statement

In 2010 the APMA and the SVS released a joint statement outlining the importance of a collaborative, multidisciplinary team approach to care for patients with DFUs. The statement stressed that podiatrists and vascular surgeons are key components of the multidisciplinary team, but also noted the need for other medical and surgical specialists who can play equally important roles in the overall care of the many diabetes-related complications affecting this fragile group. Additionally, the statement cited data that has shown the effectiveness of a multidisciplinary team approach in terms of limb salvage, decreasing patient care costs, providing an infrastructure for research and clinical trials, and benefits to physicians.<sup>iv</sup>

## Strategies to Build Effective Clinical Partnerships

- **Identify and engage podiatrists or vascular surgeons interested in DFUs/diabetic foot reconstruction.** Begin with your medical staff office and locate the podiatrists or vascular surgeons in your institution who have a specific interest in DFUs and diabetic foot management, including reconstructive surgery. An effective partnership will depend on the synergy that you build together. Another way to identify podiatrists or vascular surgeons in your community is to refer to the online member resources of the *American Podiatric Medical Association*, [www.apma.org](http://www.apma.org), and the *Society for Vascular Surgery*, [www.vascular.org](http://www.vascular.org).
- **Develop guidelines and referrals.** Published clinical pathway algorithms distributed to all services can very quickly help clinicians make decisions on when to refer for vascular laboratory studies, interpretation of those studies, and when to refer for vascular surgery or podiatry consultations. Suggested guidelines/algorithms include:
  - *An Evidence-Based Algorithm for Treating Venous Leg Ulcers Utilizing the Cochrane Database of Systematic Reviews*<sup>v</sup>
  - *An Evidence Based Approach to Treating Diabetic Foot Ulcerations in a Veteran Population*<sup>vi</sup>
  - *Inpatient Management of Diabetic Foot Disorders: A Clinical Guide*<sup>vii</sup>
  - *The Society for Vascular Surgery Lower Extremity Threatened Limb Classification System: Risk Stratification Based on Wound, Ischemia, and Foot Infection*<sup>viii</sup>
- **Establish an inpatient diabetic foot service.** Evaluation and management of inpatient DFUs can lead to early detection, early intervention, and a lower risk of major amputation. Guidelines for the team, sometimes referred to as the “Diabetic Rapid Response Acute Foot Team,” or DRRAFT,<sup>ix</sup> have been established. At a minimum, the team must include a podiatrist and a vascular surgeon. Other services to consider on the DRRAFT could be a diabetologist, an infectious diseases specialist, a plastic surgeon, a physiatrist, and physical therapists. Similar efforts are already underway in the United Kingdom, through Diabetes UK, to establish a multidisciplinary diabetic “*Foot Protection Team*” composed of podiatrists, vascular surgeons, diabetologists, and diabetes nurses in caring for a victim of a “foot attack” in both the inpatient and outpatient settings.
- **Formation of a comprehensive wound care center.** A comprehensive wound care center can bring together a number of services in the care of DFUs, as well as other poorly healing wounds. Many models exist on how to manage such a center and an excellent summary was published by Kim et al.<sup>x</sup> In keeping with the “toe and flow” model of wound care for limb salvage, most wound care centers will require the involvement of at least a podiatrist and vascular surgeon at its core. The authors suggest formation of such a center may allow your facility to become a candidate for a variety of clinical trials, deriving both an academic and economic benefit for your institution.

- **Joint community outreach events.** Working with your respective partner podiatrists or vascular surgeons, joint community outreach events can present a unified service to your audience with the goal of collaboration in caring for DFUs. Community-based education will raise awareness of DFUs, the associated specter of major amputation, and the vascular and podiatric services available for prevention, care and treatment at your institution.
- **Establish regional partnerships.** Working with a number of podiatrists and vascular surgeons in a regional partnership can help pool resources and provide effective community and continuing medical education. Regional conferences and multidisciplinary case reviews also can develop expert opinions on particularly difficult cases. One way in which this can be formally accomplished is the formation of a 501(c)(3) chapter of the *Save a Leg, Save a Life Foundation*.<sup>xi</sup>
- **National conferences.** Clinical conferences focused on care of diabetic foot ulcerations can aid in interdisciplinary education, as well as build professional partnerships with colleagues. Several meetings on this topic exist, but the Diabetic Foot Global Conference and the Diabetic Limb Salvage Meeting, are two of the most popular among vascular surgeons and podiatrists.

## Strategies to Build Effective Academic Partnerships

- **Participate in podiatric training.** Podiatrists have been long recognized as the “gatekeeper” in the DFU management algorithm. Working with the local podiatry school or a podiatric residency training program can be an excellent way to build new partnerships. Vascular surgeons can help to provide a fundamental education in vascular surgery to equip new podiatrists with the tools and knowledge to more effectively evaluate and manage a DFU. Educating podiatrists on surgical and advanced minimally invasive revascularization will encourage early referral to a vascular surgeon and potentially enhance functional limb salvage. A list of podiatry schools and residency training programs can be found at the Council on Podiatric Medical Education’s website, [www.cpme.org](http://www.cpme.org).
- **Participate in vascular surgery training.** Formal vascular surgery training includes minor and major amputations, but there is very little emphasis on complex foot reconstructions or the fundamentals of foot biomechanics. Podiatrists can provide these fundamentals to vascular surgery trainees to help them identify and plan for revascularizations that will optimize the patient for eventual reconstruction and limb salvage. Educating vascular surgeons on complex foot reconstruction, as well as long-term preventative amputation measures, also will encourage early referral to a podiatrist and potentially enhance functional limb salvage. A list of vascular surgery residencies and fellowships can be found at the Society for Vascular Surgery’s website, [www.Vascular.org](http://www.Vascular.org).
- **Volunteer to write.** Practice guideline supplements to the *Journal of Vascular Surgery*, the *Journal of the American Podiatric Medical Association*, the *Your APMA* insert of the *APMA News* or other professional opportunities, can help interdisciplinary partnerships, as well as provide continuing education for both podiatrists and vascular surgeons.
- **Research collaboration.** Investigating novel therapies, analyzing clinical outcomes data, or adding to the literature on the basic science of the DFU can be an excellent goal for any partnership between podiatrists and vascular surgeons. The combination of resources and patients between the two professions, as well as the establishment of a wound care center, can help attract major clinical trials to facilities and provide the clinical data needed for any large scale research. Medical and podiatry schools also can collaborate laboratory and basic science resources to investigate the fundamental elements of the DFU and begin the development of novel therapies. Another avenue is presentation of research at the SVS Vascular Annual Meeting.

## Conclusion

A strong partnership between podiatrists and vascular surgeons will lead to improved outcomes for patients with diabetic foot ulcers. While there are several strategies to employ, and some of these can be quite involved, all will be

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professionally rewarding and beneficial to patients. Future collaborative efforts are always being developed, the most recent of which is the active recruitment of podiatrists to become Associate Members in the Society for Vascular Surgery. Membership within the SVS helps provide podiatrists with additional opportunities in education and research, as well as further enhances the inter-professional partnership between the specialties.

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<sup>i</sup>Sumpio BE, Armstrong DG, Lavery LA, et al. The role of interdisciplinary team approach in the management of the diabetic foot. *J Vasc Surg* 2010;51:1504-1506.

<sup>ii</sup>Driver VR, Fabbi M, Lavery LA, et al. The costs of diabetic foot: the economic case for the limb salvage team. *J Vasc Surg* 2010;52:17S-22S.

<sup>iii</sup>Carls GS, Gibson TB, Driver VR, Wrobel JS, Garoufalis MG, Defrancis RR, Wang S, Bagalman JE, Christina JR. The economic value of specialized lower-extremity medical care by podiatric physicians in the treatment of diabetic foot ulcers. *J Am Podiatr Med Assoc*. 2011 Mar-Apr;101(2):93-115.

<sup>iv</sup>Sumpio BE, Armstrong DG, Lavery LA, et al. The role of interdisciplinary team approach in the management of the diabetic foot. *J Vasc Surg* 2010;51:1504-1506.

<sup>v</sup>Online resource through the WOUNDS website. [http://jdfc.org/wp-content/uploads/2011/11/v3-i3-a2\\_Treating\\_Diabetic\\_Foot\\_Ulcerations1.pdf](http://jdfc.org/wp-content/uploads/2011/11/v3-i3-a2_Treating_Diabetic_Foot_Ulcerations1.pdf)

<sup>vi</sup>Kimmel H, Regler J. An evidence based approach to treating diabetic foot ulcerations in a veteran population. *The Journal of Diabetic Foot Complications* 2011;3:50-54.

<sup>vii</sup>Wukich DK, Armstrong DG, Attinger CE, et al. Inpatient management of diabetic foot disorders: a clinical guide. *Diabetes Care* 2013;36:2862-2871.

<sup>viii</sup>Mills JL, Conte MS, Armstrong DG, et al. The Society for Vascular Surgery lower extremity threatened limb classification system: risk stratification based on wound, ischemia, and foot infection. *J Vasc Surg* 2014;59:220-234.

<sup>ix</sup>Fitzgerald RH, Mills JL, Joseph W, et al. The diabetic rapid response acute foot team: 7 essential skills for targeted limb salvage. *Eplasty* 2009;9:e15.

<sup>x</sup>Kim PJ, Evans KK, Steinberg JS, et al. Critical elements to building an effective wound care center. *J Vasc Surg* 2013;57:1703-1709.

<sup>xi</sup><http://www.thesalsal.org/>

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