

New Evidence-Based Therapies for Complex Diabetic Foot Wounds

Andrew J.M. Boulton, MD, DSc (Hon),
FACP, FRCP^{1,2}

David G. Armstrong, DPM, MD, PhD^{3,4}

Magnus Löndahl, MD, PhD^{5,6}

Robert G. Frykberg, DPM, MPH⁷

Frances L. Game, MD⁸

Michael E. Edmonds, MD, FRCP⁹

Dennis P. Orgill, MD, PhD¹⁰

Kimberly Kramer, MPH¹⁰

Geoffrey C. Gurtner, MD, FACS¹¹

Michael Januszzyk, MD, PhD¹¹

Loretta Vileikyte, MD, PhD^{1,2}

ABSTRACT | This publication is the third in a series of American Diabetes Association compendia on the diabetic foot. Previous installments focused on the diagnosis and management of diabetes foot complications and infections. Here, the authors turn their attention to the latest evidence-based therapies for diabetic foot ulcers (DFUs). The monograph begins with an overview of the current state of diabetic foot care, as well as a brief history of oxygen therapy for the treatment of DFUs. The most recently published evidence-based data concern topical oxygen therapies, and these are described in detail. Subsequent sections summarize the evidence published mainly in the past decade for specific treatments, including autologous leucocyte, platelet, and fibrin multilayered patches; sucrose octasulfate dressings; and negative pressure wound therapy. The authors discuss the evidence related to the use of new therapies specifically for the treatment of neuropathic and neuroischemic lesions. They then look to the future at new treatment approaches in the development pipeline, as well as the emerging role of wearable technologies such as digitally connected insoles and socks in preventing DFU recurrence. Throughout the compendium, the authors present their view of current and forthcoming treatment options and identify areas worthy of additional research in the years ahead.

After the outstanding success of two previous American Diabetes Association (ADA) compendia on the diabetic foot—*Diagnosis and Management of Diabetic Foot Complications* (1) and *Diagnosis and Management of Diabetic Foot Infections* (2)—the Association asked us to proceed with a third volume.

At the time of writing, the International Diabetes Federation had just published the 10th edition of its *IDF Diabetes Atlas* (3), which, in many ways, makes for depressing reading. The past 2 years have seen a 16% increase in the global prevalence of diabetes, with one in 10, or >537 million, adults now having the disease. However, depressing though these data are, they do not take into account the impact the current global coronavirus disease 2019 (COVID-19) pandemic will likely have on the worldwide prevalence of diabetes and its complications. Our pessimism regarding this possible impact is supported by a recent study from the United Kingdom which, using A1C as a surrogate, estimated the effect of the pandemic on diabetes diagnosis and management (4). An 80% reduction in A1C testing was reported in April 2020;

¹University of Manchester, Manchester, UK

²University of Miami Miller School of Medicine, Miami, FL

³Keck School of Medicine of the University of Southern California, Los Angeles, CA

⁴Southwestern Academic Limb Salvage Alliance (SALSA), Los Angeles, CA

⁵Department of Endocrinology, Skane University Hospital, Lund, Sweden

⁶Department of Clinical Sciences, Lund University, Lund, Sweden

⁷Midwestern University, Glendale, AZ

⁸University Hospitals of Derby and Burton NHS Foundation Trust, Derby, U.K.

⁹King's College Hospital, London, U.K.

¹⁰Division of Plastic Surgery, Brigham and Women's Hospital, Boston, MA

¹¹Department of Surgery, Division of Plastic and Reconstructive Surgery, Stanford University School of Medicine, Stanford, CA

Address correspondence to
Andrew J.M. Boulton,
ABoulton@med.miami.edu,
and David G. Armstrong,
armstrong@usa.net.