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The North Carolina Specialty Hospital Wound Healing and Hyperbaric Center in Durham stands out among Triangle clinics dedicated to wound care.

The Wound Healing and Hyperbaric Center's doors opened in February 2013, the brainchild of local plastic surgeon Edward C. Ray, M.D., and the product of collaboration among North Carolina Specialty Hospital, Triangle Orthopaedic Associates and Healogics, the nation's largest provider of advanced wound care services.

Today, the North Carolina Specialty Hospital (NCSH) Wound Healing and Hyperbaric Center is staffed by surgeon Walter Woodrow "Woody" Burns III, M.D., and interventional radiologist Susan "Sue" Weeks, M.D.

Finishing its third year in operation, the Wound Healing and Hyperbaric Center was presented the 2015 Center of Distinction Award by Healogics for achieving outstanding clinical outcomes for 12 consecutive months. During this time period, the center earned a patient satisfaction rate of greater than 92 percent and a wound healing rate of at least 91 percent within 30 median days, among other quality outcomes.

Healogics is affiliated with more than 780 centers, and the NCSH Wound Center was one of only 221 centers to achieve this honor.

"It is an honor for our clinic to receive this award, and I think it reflects what a great team we have at the wound clinic, including the nurses and other office staff. Everyone here enjoys their job and works very hard to take excellent care of our patients in a caring, friendly and respectful manner," says Dr. Burns.

Staff addresses a question from an Hyperbaric Oxygen Therapy patient

NCSH Wound Healing and Hyperbaric Center provides care for all wound etiologies. Given the increasing rates of diabetes and obesity, the majority of ulcers treated in wound clinics are diabetic foot ulcers (DFU) and venous stasis ulcers (VSU). An estimated 6,500,000 Americans are affected by chronic ulcers, approximately 2,000,000 of which are DFUs, and 600,000 of which are VSUs1.

"A chronic wound is a game changer for many people. It affects their psyche, it affects their ability to participate in society. In the bigger picture, it can be a harbinger of things to come," says Dr. Weeks. "We take amputation-prevention very seriously. The five-year mortality rate for a diabetic patient following a major amputation approaches 50 percent, so healing these wounds and preventing future wounds is paramount to the overall health of the patient.

"The goal of the NCSH Wound Center is not just to heal the wound, but to help the patient develop strategies to avoid re-wounding. It's a part of helping them take charge of their life," she says.

Wound center patients are usually referred for wound care by their primary care provider or a specialist consultant. They also may refer themselves.

Wounds of different etiologies need to be treated differently, and each wound is evaluated to identify the appropriate treatment plan. Most patients seen at the NCSH Wound Center have chronic wounds, which no longer follow the normal healing cycle2.

Dr. Woody Burns discusses the healing progress of a patient's wound

A typical acute wound proceeds through four stages while healing: hemostasis, inflammation, proliferation and remodeling. If adverse systemic or local influences affect the wound, these influences can suspend the wound in the inflammatory state, leading to a chronic, nonhealing ulceration. If the negative influences can be identified and treated, the wound should return to the more "normal" healing cycle.

To that end, during the initial visit, patients' wounds are evaluated for a multitude of adverse conditions, including hypoperfusion, presence of non-viable tissue, infection, inflammation, edema and undue pressure. Patient pain and systemic illness are assessed.

For lower extremity ulcers the presence of adequate blood flow is assessed on initial exam by obtaining an ankle brachial (ABI) or toe brachial (TBI) index. If needed, further evaluation with arterial ultrasound (US), trans-cutaneous oxygen measurement (TCOM) or consultation by a vascular specialist may be required to restore adequate blood flow for healing.

Non-viable tissue is debrided, and infection is treated. Radiographs or magnetic resonance imaging (MRI) scans are obtained as indicated. Edema is improved with compression wraps when possible, and offloading is addressed usually by casting or orthotics.

Patients return for frequent followup visits, and each time the wound is re-assessed and treatment modified as indicated. Evidence suggests that a wound that does not decrease 50 percent in volume during the first four weeks will be more difficult to heal, so it is the wound center's goal to reach that initial benchmark in wound healing3. If a wound does not meet appropriate healing criteria, more aggressive therapies can be utilized, including negative pressure wound therapy (NPWT), bioengineered tissue placement and, in some cases, hyperbaric oxygen therapy (HBO).

Negative pressure wound therapy is a proven therapeutic option for healing ulcerations, as it enhances local blood flow, decreases edema and facilitates growth of granulation tissue across the wound bed4. A more recent development is that of the single use NPWT device, which allows for single placement weekly in patients whose wound characteristics meet criteria.

Bioengineered tissues continue to evolve and are derived from human, animal and synthetic sources. These "skin substitutes," also known as "bioactive alternative tissues" and "cellular- and tissue-based products," can be highly effective when selected appropriately. They come in two general categories: dermal substrate replacement products and dermoinductive products. The former are used for wound-bed preparation to support the underlying dermal matrix, and the latter are used for wound closure.

Available at NCSH Wound Healing and Hyperbaric Center, hyperbaric oxygen therapy is an advanced modality used to treat selective ulcerations and certain non-wound conditions.

Medicare acknowledges 15 indications for HBO, including diabetic foot ulcers with associated deep soft-tissue infection; abscess, or osteomyelitis; acute arterial insufficiency; osteoradionecrosis or soft tissue radionecrosis; chronic refractory osteomyelitis; crush injuries; necrotizing fasciitis; and preparation and preservation of compromised skin grafts. Commercial insurance will consider other indications for HBO that have been approved by the Undersea and Hyperbaric Medical Society (UHMS), including idiopathic sudden sensorineural hearing loss, compromised flaps and "selected problem wounds." The best clinical evidence (Level 1) exists for HBO treatment of ischemic, infected (Wagner Grade 3 or higher) diabetic foot ulcers5.

Transcutaneous oxygen measurements (TCOM) are used to assess oxygenation of the periwound skin and as an indirect measurement of microcirculatory blood flow. This technology is an effective screening tool to identify patients at risk for wound-healing failure secondary to local periwound hypoxia. It also helps to identify patients most likely to benefit from HBO, as well as predict therapeutic response.

In addition to weekly wound care, patients

undergo concommitant HBO therapy are seen each week to assess clinical response. Each HBO treatment takes about two hours, and patients typically undergo 20 to 40 treatments during a four-to-eight-week period depending on their indication.

During this treatment, the patient is slowly brought to a pressure of 2 Atmospheres Absolute, which is the equivalent of 33 feet of sea water. One-hundred percent oxygen flows into the single-person chamber in order to hyperoxygenate the blood. This pressure and oxygen concentration causes increased diffusion of oxygen into the plasma, which has been shown to increase tissue oxygenation, improve cell metabolism, increase collagen deposition, improve edema, increase extracellular matrix proteins, improve bacteriocidal activity and decrease exotoxin effects, as well as enhance antibiotic action.

HBO has been shown to enhance growth factors, increase angiogenesis, decrease inflammation, and increase stem cell mobilization. Overall, HBO has been shown to decrease risk of major amputation and to be a cost-effective adjunct to standard therapy (6,7).

The advantages a wound center can offer are numerous. Studies have shown that centers specializing in wound care, by adhering to evidence-based clinical practice guidelines, are able to achieve higher healing rates, demonstrate faster healing times and deliver more cost-effective care.

The North Carolina Specialty Hospital Wound Healing and Hyperbaric Center focuses on the wound, employing the latest technological advances to heal the wound and helping the patient identify behaviors that can be modified to help avoid recurrent wounding. In the case of diabetic foot ulcers, this might include appropriate long-term orthotic use, diabetic shoes and daily foot checks. Long-term use of compression, treatment of abnormally refluxing veins and protection from leg trauma resulting from venous stasis ulcerations may be enough to avoid future venous stasis ulcerations.

North Carolina Specialty Hospital Wound Healing and Hyperbaric Center facility

Providing care for these patients often requires a multidisciplinary approach. An important function of the wound center is to coordinate each patient's care plan with his or her primary care physician and specialists who may be involved in the treatment of each patient, such as those specializing in vascular surgery, orthopedics, podiatry, infectious disease, endocrinology and plastic surgery.

A graduate of Duke University, Dr. Weeks completed medical school and her residency and fellowship at the University of North Carolina (UNC) at Chapel Hill. She is a board-certified interventional radiologist and serves as medical director of the NCSH Wound Center as well as the Triangle Orthopaedic Associates Vein Clinic.

Dr. Burns is a graduate of Davidson College and completed his medical school at Wake Forest University and residency at UNC. A board-certified general surgeon, he practices wound care full-time.

Kelly Bennett is a certified wound care nurse and the center's clinical nurse coordinator. She graduated from UNC-Greensboro School of Nursing.

The wound NCSH Wound Center is located at 4315 Ben Franklin Blvd., Durham, NC 27704. Office hours are from Monday-Friday, 8 a.m. to 5 p.m. For more information call (919) 595-8490.

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