WORLD WALK "Teaching the Teachers" Model:

Merging Hand's-on Training with Wound Healing Telemedicine Technologies for Creating Collaboration Among Medical and Surgical Communities in Underserved Regions of the World

World Walk (www.worldwalkfoundation.org) started because of an observed need for specialty training teams in all regions of the developing world for treating diseases of the lower extremity that would prevent both children and adults from having the ability to walk independently and without pain.

Countless children in the developing world live their entire lives with the deforming and disfiguring effects of polio, cerebral palsy and other neurologic and genetic diseases that prevent these children from experiencing the simple joy of walking and running like all the children they see around them every day of their lives.

Similarly, the ravages of diseases like leprosy, arterial and venous disease, pressure necrosis and diabetes cause unspeakable suffering and, in cases of patients with diabetes, arterial disease and leprosy (Hansen's Disease), the potential loss of their limbs to amputation and also death from sepsis (blood poisoning).

Regarding the wound healing and diabetic amputation initiatives of World Walk, over the past 17 years, we have been building a curriculum, specifically addressing the needs of those people at-risk for lower extremity amputation and death from sepsis, particularly from the complications of diabetes.

The model is unique in that it maintains the importance of joining the medical and surgical communities in any region or country in a partnership for seamless assessment, communication and treatment of diabetic foot ulcers and infections in a timely manner. Historically, it has been the lack of timely assessment by the medical and surgical community that has prevented early intervention in these wounds, reducing the chance of optimal healing outcomes, including amputation prevention.

Fundamentally, the World Walk model for diabetic patient patients includes several important elements, each one contributing to the educational and therapeutic impact of the entire program on both a local and regional level. These elements include:

1. ***Primary Care, Patient and community diabetic education, and diabetic foot care***

a. Glycemic control

b. Diet, weight control

c. Exercise

d. Smoking cessation

e. Self-inspection of feet and legs for wounds, drainage or infection

f. Regular appointments with Primary Care Physician and preventive diabetic foot care provider

2. ***Use of media resources to support patient and community education elements (above)***

a. TV

b. Newspapers

c. Magazines

d. Radio

3. ***Primary Care Physician education for wound diagnosis, healing and amputation prevention (<u>On-site classroom and clinical instruction</u>)***

a. H&P of the diabetic patient

b. Wound diagnosis, staging and determination of degree of infection and ischemia

c. With information from a. and b., above, determine if patient can be treated locally, or if patient needs to be tranferred for surgical care and understand the urgency of that transfer, e.g., if abcess and/or gas gangrene is present **(<u>Central concept for amputation and sepsis prevention</u>).**

4. ***Surgical training for wound diagnosis, surgical treatment, including lower extremity reconstruction, with the ultimate outcome being amputation prevention (<u>On-site classroom and clinical instruction</u>)***

5. ***Rehabilitation staff training for independent, pain-free ambulation and return of diabetic patients to the community***

6. ***Remote Wound Telemedicine Consultations from International Experts (WoundTool)***

7. ***Live Webcasts on all aspects of Primary Care, Surgical Care, Rehabilitation, Patient and Community Education for the Diabetic Patient (with archiving on website)***

This model, recently introduced in Haiti, is actually the result of years of cumulative concepts contributions to World Walk by, and collaboration with, leaders like Karrel Bakker, MD, PhD and Kristien Van Acker, MD, from the IDF, Owen Bernard from the Diabetes Association of Jamaica, Errol Morrison, MD, from the University of the West Indies in Jamaica, Jose Moguel, MD, in Belize, Marcus Castro-Ferreira, MD, in Sao Paolo, Brazil, Rafael Barrios, MD, in Venezuela, David Armstrong, DPM, PhD, from IWGDF and the University of Arizona, , Stephen Rith-Najarian, MD, in the U.S. Indian Health Service, Bal Jog, MD, from the Diabetic Foot Society of India, and Patrick DeHeer, DPM, John Macdonald, MD, Nancy Larco, MD, and Adler Francius, MD, in Haiti. Our model, having been under construction for sixteen years, was literally build on the backs of these giants, without whom, we would not have what we now have to offer to the world.

In addition to the central theme of medical and surgical training and collaboration and the importance of on-going patient and community education (Elements 1, 2, 3, 4, 5 and 7, above), these academic and clinical educational programs may be facilitated by the integration of a wound telemedicine system (***WoundTool***) in the model (Element 6, above), being developed to augment not only the clinical efficiency in decision-making among medical and surgical caregivers but also as an educational tool in improving the quality of the wound prevention and care in any country or region.

Through primary care physician training about the diabetic foot, and early awareness of the patient's wound condition, a public health center can facilitate the PCP either knowing the proper treatment for less complex wounds locally, but also allowing the PCP to know when to transfer that patient for surgical care as promptly as is required by the particular condition of the patient and the wound.

As noted above, the delay in referring appropriate patients for urgent or emergent surgical care has been the historical, universal road block to limb preservation among the diabetic community, anywhere in the world. We feel that the decision-making regarding appropriate location for continued care, i.e., clinic or hospital for surgical treatment, e.g., incision and drainage of abcess, debridement of osteomyelitis or necrotic and/or infected soft tissue, will be facilitated greatly by the implementation of the ***WoundTool*** into this wound healing clinical pathway.

We are proposing a Beta Test of the ***WoundTool*** among a select leadership group of medical and surgical caregiver partners in the countries of Jamaica, Belize, Venezuela, Brazil and Haiti, St. Vincent's, Anguilla and Granada. The test will simply be a submission of diabetic (or other) difficult wound cases that caregivers will submit using the ***WoundTool*** server, accessible

through their hand-held device, laptop or desktop. Basic History &Physical Examination information will be requested as part of the submission data set, including results of wound and/or infection evaluation, clinical vascular and neurological (neuropathy) examinations, medications, and recent blood sugars and other significant laboratory and radiographic studies.

After evaluation of this in-coming case history, our networked wound team in the U.S. and other countries will develop an **"e" wound management plan (diagnostics and treatments)** which will be returned to the submitting caregiver(s) at the point of care. In addition, other elements can be added to the "e" management plan such as instructional videos, chosen by the expert to augment the value of that particular management plan to optimize healing outcomes in that case. Each case will be filed through the server system for easy access for reviewing each case history, as well as evaluation of healing outcomes and, evaluation through other analytics, of other parameters such as cost-effectiveness of care and quality of life (QOL).

In essence, this network of wound experts, using the WoundTool technology, can participate as international wound mission volunteers without ever leaving their office or home. All participants will be able to see all of the submitted cases and can respond to these other case submissions as well. In this way, a dialogue is created among participating wound caregivers with the ultimate goal being to provide advice on individualized care plans based on "best practices." Also, by having the other participants contributing comments about the other cases, they can participate as a "wound team" member in the development of the individual care plan by offering their knowledge and experience with such cases. We would hope that those wound caregivers who participate in submitting cases would consider our expert-network members as equal partners, working together as a team towards the goal of a new standard of global wound prevention, wound healing, and amputation prevention.

The ***WoundTool*** system may contribute to expanding educational opportunities for improving the standard of wound diagnosis and treatment within the Caribbean and Latin American regions, particularly as it relates to diabetes and amputation prevention. With the wound specialist available by computer, a wound consultation is only an email away facilitated by the ***WoundTool*** system. The vision is for this system, after being tested in this hemisphere, to be tested in other developing regions of the world.

The software built into the device allows for evaluation of rates of wound healing at 4 weeks, 8 weeks, 12 weeks, and 16 weeks to be able to assess the rate of wound healing relative to a chronicity benchmark **(Chronicity Algorithm).** The internal benchmarks built into the ***WoundTool*** can then initiate a systematic review of the reasons why the wound is slow to heal and suggest the evidence-based diagnostics and treatment protocols necessary to create a more effective healing trajectory for that particular wound. A gradient of "triggers" has been designed to either instruct the medical and nursing caregiver to proceed with an evidence-based treatment or to direct certain patients with an acute wound for more advanced care in a hospital setting, including medical management of diabetes, debridement, incision and drainage of abcess, IV antibiotics, followed by foot reconstruction including skin grafts and flaps.

Through the **Intelligent Registry** system built into the ***WoundTool*****,** this system would allow tracking the patient through the continuum of care, whether they are sent to the hospital and then are discharged to home and even readmitted to the hospital again, creating seamless management of chronic wounds in the community, regardless of where the patient is living at a particular time.

The fiscal implications to public health centers and hospital wound care may be significant. Including wound product and treatment data in the patient's database can allow for cost-effectiveness studies on products paid for by institutions related to rates of wound healing, to allow facilities to use this data to choose products based on the need for fiscally sound optimal healing.

Ultimately, this hand-held device will facilitate prevention of wounds, early intervention in wounds that are becoming chronic, and guiding patients to the appropriate venue of wound care in a timely manner (essential for diabetic amputation prevention), which will allow for the overall rates of healing to increase dramatically and the prevention of new wounds to accelerate as well over time in any given patient population.

In summary, the World Walk model includes several important elements, each one contributing to the educational and therapeutic impact of the entire program on both a local and regional level.

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