

wound healing perspectives®

A CLINICAL PATHWAY TO SUCCESS

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➔ ADVANCED WOUND THERAPY

A PUBLICATION OF NATIONAL HEALING CORPORATION®

Advanced treatment options to heal more people

Wound care is a significant segment of the US health care industry. Based on a survey of current scientific literature, estimated expenditures are more than six billion dollars. There are two primary drivers fueling this market: changing health and demographic trends and exploding growth in the number of new wound care products rolled out by medical device, biotechnology, and pharmaceutical companies.

The increasing prevalence and incidence of diabetes, heart disease, and obesity we are all seeing is causing a similar increase in the number of people with chronic wounds.

Some of the most powerful new tools in wound care are KCI's V.A.C.® (Vacuum Assisted Closure), negative pressure therapy used with a special dressing; Smith and Nephew's Dermagraft®; and Organogenesis' Apligraf®. The global dressings market is expected to reach more than six billion dollars by 2009 and is currently growing at about 8.5% annually.

As healthcare companies continue to pioneer the advancement of wound healing modalities, researchers continue to analyze and assess various treatments. This newsletter serves as an overview of the most successful devices and treatments available today. ■

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Medical maggots make a comeback

According to R Sherman (2005), the FDA gave clearance to produce and market medical maggots for "debriding non-healing necrotic skin and soft tissue wounds, including pressure ulcers, venous stasis ulcers, neuropathic foot ulcers, and non-healing or post traumatic or post surgical wounds." While the FDA has not considered, nor approved, any claims of disinfection or growth-promoting properties, there are, nevertheless, both clinical and scientific studies that address the antibacterial and growth-promoting properties of maggots.

In fact, research shows that maggot therapy may heal a wound more quickly and efficiently than other approaches. Moving over the surface of wounds, maggots secrete a rich mixture of proteolytic enzymes, which liquidizes dead tissue. Maggots then ingest this, and, by raising the pH of wounds and secreting chemicals, can prevent the growth of some bacteria. Normal tissue is not removed because the enzymes are neutralized when they come into contact with it.

Medical maggots are used



APPEARANCE OF WOUND BEFORE REMOVAL OF THE MAGGOTS.

today in more than 300 sites around the country, including specialized wound centers and tertiary care hospitals, specialized and general medical outpatient clinics,

(continued on page 2)



HIGHLIGHTS INSIDE

Leeches	2
Bioengineered tissue and diabetic foot ulcers	2,3,4
Other advanced products	3
Apligraf®	4
Hyperbaric oxygen and diabetic foot ulcers	5
Dermagraft®	5
Hyperbaric oxygen with flaps and grafts	6
Hyperbaric oxygen and infection	6
Negative pressure wound therapy	7,8
Working with a Wound Healing Center	8

Leeches



Leeches, another folk remedy handed down through the ages, have curative effects due to the components of their saliva. Hirudin is the principal anticoagulant in leech saliva. Other properties of this saliva are that it is:

- antithrombotic,
- thrombolytic,
- vasodilatory,
- anti-inflammatory,
- bacteriostatic, and
- analgesic.

Leeches are used primarily for the treatment of venous insufficiency in salvageable tissue with intact arterial perfusion following reconstructive and plastic surgery. ■

Medical maggots *(continued from page 1)*

extended care facilities, private practitioners' offices, and even by visiting nurses who apply the maggot dressings in patients' homes. Maggot therapy will soon increase, just as it has in the rest of the world. In the United States, the demand for medical maggots has increased by about 20% per year over the past 10 years. Since the FDA ruling last year, the demand has already doubled. (Sherman, 2005)

Maggot therapy may prove to be a cost-effective and useful aid in the management of selected cases of difficult wounds and ulcers. It is also important to consider maggot therapy in individuals for whom antibiotics or surgery are ineffective, associated with high risk, or unavailable. Maggot debridement will be of particular benefit to communities

with poor resources which have endemic, chronic, and intractable wound problems such as those in tropical and developing countries. (Chaudhry and Bayat, 2002).

Larval therapy: a study

Since ancient times, larval therapy has been reputed to help wound healing. Its use has recently been rediscovered and it is now enjoying increasing interest in clinical practice, as well as in research. In 2003, H Wolff, et al. investigated the effects of larval therapy on wounds in an open study of 74 patients with necrotic or sloughy chronic ulcers of different etiologies. The researchers found larval therapy to effectively debride 86% of the necrotic ulcers, and a single application was clinically beneficial in two-thirds of the patients.

Failure to debride was mostly attributable to larval death. No ulcer type was shown to be more suited to larval therapy than others; however, there was an excellent response in all 29 patients with diabetes. Larval therapy was also noted to reduce odor in 58% of the 31 foul-smelling ulcers of mixed etiology. No serious side-effects were observed. One-quarter of the study group experienced less pain during treatment, while 41% felt no difference in pain, and, although 34% noted an increase in pain, most of these patients wanted to continue the treatment because of subjective and objective visual improvement in wound debridement. In conclusion, the researchers found larval therapy to be effective for debriding ulcers, easy to use and well accepted by the patients. ■

Bioengineered tissue and diabetic foot ulcers

Tissue engineering is an emerging technology and holds the promise of an entirely new approach to the repair and reconstruction of tissues and organs damaged by disease. Tissue engineering is defined as "the use of living cells together with extracellular compo-

nents, either natural or synthetic, in the development of implantable parts or devices for the restoration or replacement of function."

Tissue engineering research is helping to close the gap between basic research and clinical

application in the biology of wound healing. The human cell source can be fully characterized and safety-tested for possible contaminants by standard, well-recognized cell-banking testing procedures.

Normal human tissues

(continued on page 3)

Bioengineered tissue *(continued from page 2)*

may be more efficacious in that they supply a balanced natural mix of growth factors and both structural and interactive functional proteins. These tissues can communicate with the body's own repair mechanisms to stimulate angiogenesis, remodeling, and other steps to restore complete function. (Roberts, 1998)

Apligraf® clinical results

Following is an overview of a prospective, randomized, controlled study that was conducted to compare Apligraf® plus conventional therapy (debridement, saline dressings, total off-loading) to conventional therapy alone.* Apligraf® was proven to heal venous leg ulcers faster than compression therapy alone. The pivotal trial consisted of 208 patients with diabetic foot ulcers; 67 with type I diabetes; 139 with type II diabetes; 2 not specified. The study excluded patients who exhibited rapid healing (>30% closure from day -7 to day 0).

All patients had ulcers on the plantar surface of the foot. The mean ulcer size was 2.97 cm² and 2.83 cm² in the Apligraf® and the control group, respectively. Mean duration of wounds was 12 months in the Apligraf® group and 11 months in the control group. All patients used either crutches or a wheelchair for the first 6

weeks, followed by customized pressure-relieving footwear for at least 4 weeks post closure. Apligraf® was shown to be significantly more effective than conventional therapy. By 12 weeks of treatment, 56% (63/112) of diabetic foot ulcers treated with Apligraf® plus conventional therapy (debridement, saline dressings, total off-loading) were 100% closed, compared to 39% (36/96) of ulcers treated with conventional therapy alone (P=.0026).

The median time to 100% wound closure was 65 days for diabetic foot ulcers treated with Apligraf® plus conventional therapy vs. 90 days for ulcers treated with conventional therapy alone (P=.0026).

At 6 months after the initiation of therapy, the incidence of ulcer recurrence was 8% (5/63) in the Apligraf® group and 17% (6/36) in the control group. (These results are not statistically different.)

Patients receiving Apligraf® had a statistically significant (P<.05) lower incidence of osteomyelitis at the study ulcer site (2.7% vs. 10.4%) compared to patients treated with conventional therapy at 6 months. (These data compare with 8.9% and 3.1%, respectively, at sites other than the study ulcer).

All patients were screened at baseline and underwent x-ray evaluation for clinical signs of infection. Osteomyelitis may be associated with a higher frequency of amputation in patients with diabetic foot ulcers.

Apligraf®-treated patients required significantly fewer amputations/resections of the study limb (6.3% vs. 15.6%) [P<.05] compared to patients treated with conventional therapy at 6 months.

***FROM APLIGRAF®.COM**

Dermagraft® clinical results

In 1998, Bowering noted that diabetic patients experience the highest rate of disease-related lower extremity amputations among all population groups. Although the causal pathways for these amputations are multifactorial, a retrospective analysis of diabetes patients who had undergone amputation cited faulty wound healing as a contributing factor in 81% of cases.

One of the most promising new areas of therapy addressing the potential deficiency in wound growth factors and abnormalities of the matrix proteins in diabetics is the bioengineered skin replacement, Dermagraft®.

According to Bowering, Gentzkow et al., (1993) conducted a pilot study of

(continued on page 4)

Other advanced products

GraftJacket®

(Wright Medical Technology)
An intact, three-dimensional matrix that provides a means for the body to rebuild the area of missing tissue.
www.wmt.com

Integra Bilayer Matrix Wound Dressing™

(Integra Lifesciences Corporation)
A tissue-engineered matrix that provides immediate wound coverage and is highly conformable for various anatomical sites.
www.integra-ls.com

Oasis®

(Healthpoint)
A biologically derived extracellular matrix-based wound product that is compatible with human tissue.
www.healthpoint.com

Promogran™ Matrix

(Johnson & Johnson)
A sterile, freeze-dried matrix composite of oxidized regenerated cellulose and collagen that transforms into a soft, conformable, biodegradable gel, allowing contact with all areas of the wound.
www.promogran.com

Regranex Gel®

(Johnson & Johnson)
Becaplermin made of recombinant human platelet-derived growth factor derived from yeast cells.
www.regranex.com

Apligraf®



Indications

Indicated for use along with standard compression therapy in venous ulcers of at least 1 month in duration that have not adequately responded to conventional ulcer therapy.

Apligraf® is also indicated for use with conventional diabetic foot ulcer care for the treatment of full-thickness neuropathic diabetic foot ulcers of greater than three weeks duration.

Product description

Apligraf® is supplied as a living, bi-layered cell therapy. Like human skin, Apligraf® consists of living cells and structural proteins. The lower dermal layer combines bovine type 1 collagen and human fibroblasts (dermal cells), which produce additional matrix proteins. The upper epidermal layer is formed by promoting human keratinocytes (epidermal cells) first to multiply and then to differentiate to replicate the architecture of the human epidermis. Unlike human skin, Apligraf® does not contain melanocytes, Langerhans' cells, macrophages, and lymphocytes, or other structures such as blood vessels, hair follicles, or sweat glands. ■

APLIGRAF® VS. DERMAGRAFT®		
	APLIGRAF®	DERMAGRAFT®
DESCRIPTION	Fully differentiated bi-layered cell therapy.	Human fibroblast-derived dermal substitute.
CONTENT	Epidermal layer formed by human keratinocytes and has well-differentiated stratum corneum; dermal layer composed of human fibroblasts in bovine Type I collagen lattice.	Composed of human fibroblasts, extracellular matrix, and bioabsorbable scaffold; does not contain macrophages, lymphocytes, blood vessels, or hair follicles.
CULTURED	In vitro.	In vitro.
ACTION	Apligraf® promotes wound healing by expressing multiple growth factors found in normal skin and providing a biologically active matrix.	Dermagraft®, when implanted into adequately prepared diabetic foot ulcers, assists in the restoration of the dermal bed allowing wound to heal (re-epithelialize).
INDICATION	For the treatment of non-infected partial and full-thickness skin ulcers due to venous insufficiency. Also for use with standard diabetic foot ulcer care for the treatment of full-thickness neuropathic diabetic foot ulcers.	For use in the treatment of full-thickness diabetic foot ulcers.

Bioengineered tissue *(continued from page 3)*

Dermagraft® in humans to evaluate its efficacy in the treatment of patients with diabetic, neuropathic ulcers, and assessed the most appropriate dosages for treatment. The single-blind 12-week trial involved 50 enrolled patients with either Type I or Type II diabetes and plantar surface, full-thickness, neuropathic ulcers with adequate circulation (as determined by clinical signs and an ankle-brachial index of >0.7).

Patients were randomized to one of four treatment arms:

- One piece of Dermagraft® applied to the wound weekly
- One piece of Dermagraft® applied to the wound every two weeks
- Two pieces of

Dermagraft® applied to the wound every two weeks
 ■ And a control group treated with conventional therapy

All patients received standard care with wound debridement and pressure relief with custom-fitted footwear. All wounds were treated with saline-moistened gauze.

Analysis of patients' ulcers 12 weeks after initiation of therapy demonstrated the best rate of complete ulcer closure in those patients in whom Dermagraft® was applied weekly for 8 weeks, 50.0% vs. 7.7% in the control group (P = 0.03). Healing occurred in 21.4% of those who received 2 applications every 2 weeks. No adverse events specific to

Dermagraft® were observed.

Also notable, Bowering observed, was the absence of any recurrence of ulcers that had been healed with Dermagraft® after a mean of 14 months of follow-up. This lack of recurrence was striking in view of various reports in the literature indicating a significant recurrence rate after healing by other methods, ranging from 19% to 46% within 8 to 22 weeks of follow-up.

Bowering concludes that with treatment modalities such as Dermagraft® to treat difficult-to-heal diabetic foot ulcers faster and more effectively, amputation rates will be reduced dramatically. ■

Effects of hyperbaric oxygen therapy in the treatment of diabetic foot ulcers

Hyperbaric oxygen therapy (HBO) has a wide range of applications in the treatment of chronic non-healing wounds. Specifically, HBO can be used successfully in hypoxic or ischemic wounds such as diabetic wounds, failing grafts and flaps, necrotizing soft tissue infections, and refractory osteomyelitis. It has also

is focal hypoxia that can involve regions of the foot, ankle, or toes. Periodic elevation of tissue oxygen tensions using adjunctive hyperbaric oxygen therapy can have a favorable influence on this pathologic process. Following is Cianci's summary of a study showing positive effects of HBO on diabetic foot ulcers.

HBO HAS SEVERAL SPECIFIC BIOLOGICAL ACTIONS WHICH CAN ENHANCE WOUND HEALING. (WRIGHT, 2001)

been reported that HBO is able to combat clinical infection such as gas gangrene by acting directly on anaerobic bacteria, enhancing leukocyte and macrophage activity, and potentiating the effects of antibiotics. (Wright 2001). Following is an overview highlighting the positive effects of HBO therapy in the treatment of diabetic foot ulcers:

Cianci (1994) writes that the net result of diabetes

Clinical results

A series of 41 diabetic patients who averaged 63 years in age were analyzed. Thirty-nine patients (97%) were suffering limb-threatening lesions. Fifty-five percent of the patients had undergone revascularization. An average Wagner Grade IV, indicating gangrene of the toes or forefoot, was obtained. Thirty-one patients (78%) had their lower extremities salvaged. Hyperbaric

charges in this series were \$15,900, total hospital charges were \$32,000, and the average length of stay was 27 days. These costs compare favorably with the cost of primary amputation, which has been previously reported as more than \$40,000. Avoidance of another \$40,000 to \$50,000 in rehabilitation costs and the additional savings involved in prevention of reamputation or stump revision has been an additional benefit.

Summary

Cianci concludes that HBO in specially designed chambers as an adjunct to current medical and surgical treatment has been demonstrated to be effective in cases of lower extremity lesions, particularly of the diabetic foot. Enhancement of fibroblast proliferation, stimulation of angiogenesis, the deposition of collagen, enhancement of white cell killing, and epithelialization can result in correction of defective wound healing. Avoidance of amputation can reduce the high cost of disability, and the shortened length of stay for chronic wounds can reduce cost of care. ■

Dermagraft®



Indications

Dermagraft® is indicated for use to treat full-thickness diabetic foot ulcers greater than six weeks duration, which extend through the dermis, but without tendon, muscle, joint capsule, or bone exposure. It should be used in conjunction with standard wound care regimens and for patients that have adequate blood supply to the involved foot.

Product description

Dermagraft® is a cryopreserved human fibroblast-derived dermal substitute manufactured from newborn foreskin tissue; it is composed of fibroblasts, extracellular matrix, and a bioabsorbable scaffold. During the manufacturing process, the human fibroblasts are seeded onto a bioabsorbable polyglactin mesh scaffold. The fibroblasts proliferate to fill the interstices of this scaffold and secrete human dermal collagen, matrix proteins, growth factors and cytokines, to create a three-dimensional human dermal substitute containing metabolically active, living cells. Dermagraft® does not contain macrophages, lymphocytes, blood vessels, or hair follicles. ■



HBO THERAPY HAS BEEN DEMONSTRATED TO BE EFFECTIVE IN THE TREATMENT OF THE DIABETIC FOOT AND HAS DECREASED THE NUMBER OF REQUIRED AMPUTATIONS.



HBO and infection

J Wright (2001) published the six actions of HBO which have been used to combat clinical infection. They include:

1. Tissue rendered hypoxic by infection is supported
2. Neutrophils are activated and rendered more efficient
3. Macrophage activity is enhanced
4. Bacterial growth is inhibited
5. Release of certain bacterial endotoxins is inhibited
6. The effect of antibiotics is potentiated

1. Support of infected hypoxic tissue: Soft tissue and bone infections are frequently accompanied by localized areas of tissue hypoxia caused by the inflammatory processes accompanying infection and by subsequent vascular thrombosis. Administration of HBO can cause the PO_2 to increase five-fold in infected tissue.

2. Neutrophil activation: As tissue PO_2 rises, leukocyte killing of bacteria becomes much more efficient. Below a PO_2 of 30 mmHg PMN killing is markedly reduced. By increasing tissue oxygen tension, a better than 'normal' antibacterial ef-

fect can be achieved. Hunt and colleagues have demonstrated that the clearance of bacteria from hypoxic tissue is enhanced by hyperoxic breathing mixtures.

3. Enhancement of macrophage activity: Macrophages, like PMNs, are affected by tissue oxygen tension. They perform a key role in combating infection by scavenging bacteria and foreign material. Under hypoxic conditions macrophages are unable to scavenge effectively and produce peroxides. While it is not yet known whether HBO can enhance macrophage function, it may be needed to bring the PO_2 of hypoxic tissue up to normal levels so that macrophages can function normally.

4. Inhibition of bacterial growth: Anaerobic bacteria are particularly susceptible to increased concentrations of oxygen. The more sensitive the anaerobic organism is to oxygen, the lower the level of superoxide dismutase, an enzyme that allows cells to defend themselves against oxygen free radicals. With HBO, large amounts of oxygen free radicals can be generated, making

anaerobic bacteria particularly susceptible to oxidative killing.

5. Inhibition of endotoxin release: In *C. perfringens* infections the major source of tissue injury and death is caused by the alpha toxin. Secretion of this toxin is suppressed by HBO. One of the mechanisms by which HBO appears to have worked is by antagonizing some of the harmful effects of bacterial endotoxin release. However, to be optimally effective, HBO must be given early in the course of infection and combined with appropriate surgical debridement and antibiotics.

6. Potentiation of antibiotics: Both Knighton, et al. and Hunt, et al. have demonstrated that oxygen adds to the effectiveness of antibiotics; the greater the concentration of oxygen, the more pronounced the effect. This has been demonstrated in experimental *Staph. aureus* osteomyelitis treated with cefazolin. In *Pseudomonas aeruginosa* infections, HBO has an additive effect with aminoglycoside antibiotics, reducing morbidity and mortality. ■

Using HBO successfully with compromised flaps and grafts



When a tissue flap becomes compromised due to ischemia, HBO can often maintain the flap until adequate revascularization is accomplished. The chamber must be used before the graft becomes unsalvageable, thus requiring early recognition and prompt referral. If a problem is anticipated while the patient is in the operating room, HBO should be used immediately following surgery. Under these circumstances, a twice-a-day regimen is optimal. (Kindwall, 1992) ■

Negative pressure wound therapy for pressure ulcers

Negative pressure wound therapy (NPWT) was developed in the 1990s by researchers at Wake Forest University School of Medicine, Winston-Salem, NC. The concept was based on the mechanics of physics. NPWT applies subatmospheric pressure, or suction, to the wound bed via a computerized therapy unit attached to an open-cell foam sponge that is placed in the

wound and secured with an adhesive drape.

A device known as the V.A.C.® (Vacuum Assisted Closure from KCI) has been shown in numerous studies to be both cost-effective and clinically superior in the healing of pressure ulcers.

A study completed by Dr. Tom Philbeck, represents the findings of a retrospective chart review of



EACH YEAR PHYSICIANS TREAT MORE THAN 270,000 PATIENTS FOR PRESSURE ULCERS.

1,170 wounds on 1,032 home-based patients. The results showed healing times for wounds treated with V.A.C.® therapy were 61% faster (97 days vs. 247 days) and cost 38% less, or almost \$9,000 per wound, when compared to saline-soaked gauze. ■

Vacuum Assisted Closure from KCI



The V.A.C.® is available for non-ambulatory and ambulatory patients, single or multiple wounds, and moderately or heavily exuding wounds. Patients are evaluated at National Healing Corporation's Wound Healing Centers to determine if they are viable candidates for V.A.C.® treatment.

PROJECTED COST TO TREAT A 22.2 CM² PRESSURE ULCER WITH V.A.C.® THERAPY COMPARED TO SALINE-SOAKED GAUZE

	FERRELL GAUZE AND LOW-AIR-LOSS BEDS	PHILBECK V.A.C.® THERAPY AND LOW-AIR-LOSS BEDS
a. Wound closure rate (average cm ² per day)	0.09	0.23
b. Time to heal (average number of days)	247	97
c. Materials cost (average cost per day)	\$10*	\$107.46**
d. Daily nursing visit cost (based on \$85 per visit)	\$85	\$42.50***
e. Materials and nursing visit cost (c + d)	\$95	\$149.96
f. Total materials and nursing visit cost to treat (b x e)	\$23,465	\$14,546

* Estimated cost of saline and gauze ** Based on predicted median reimbursement *** Visit required every 2 days

SOURCE: PHILBECK, ET AL.

Savings are estimates based on results of individual studies and may not be indications of overall savings. Individual results may vary by patient or facility depending on conditions and circumstances. Savings are not a guarantee or warranty of individual results.

Selected bibliography

Bowering CK. (1998). The use of Dermagraft® in the treatment of diabetic foot ulcers. *Today's Therapeutic Trends*, 16(1), 87-96. • Cianci P. (1994). Adjunctive Hyperbaric Oxygen Therapy in the Treatment of the Diabetic Foot. *Journal of the American Podiatric Medical Association*, [84]9, 448-455. • Falanga V, Sabolinski ML. A bilayered living skin construct (Apligraf®) accelerates complete closure of hard-to-heal venous ulcers. *Wound Repair Regen*, 1999. In press. • Fleischmann et al. (2004). *Maggot Therapy. A Handbook of Maggot-Assisted Wound Healing*. New York, NY: Thieme. • Gentzkow GD, Iwasake SD, Hershon KS, et al. (1996). Use of Dermagraft, a cultured human dermis, to treat diabetic foot ulcers. *Diabetes Care*, [19], 350-354. • Greer A. (2005). Age-old therapy gets new approval. *Advances in Skin and Wound Care*, [18]1, 12-15. • Kindwall EP. (1992). Uses of hyperbaric oxygen therapy in the 1990s. *Cleveland Clinic Journal of Medicine*. [59]5, 517-528. • Medawar PB. (1948). The cultivation of adult mammalian skin epithelium. *QJ Micro Sci*, [89]187. • Niezgoda JA. (2005). Combining negative pressure wound therapy with other wound management modalities. *OstomyWound Management*, [51]2A (Suppl.) 36S-37S. • Ramsey SD, Newton K, Blough D, et al. (1999). Incidence, outcomes, and cost of foot ulcers in patients with diabetes. *Diabetes Care*, [22] 382-387. • Roberts CD. (1998). The promise of tissue engineering in the treatment of diabetic foot ulcers. *Venture*, 24(4). • Sherman R. (2001). Maggot Therapy - The Last Five Years: European Tissue Repair Society • Wolff H, Hansson C. (2003). Larval therapy - an effective method of ulcer debridement. *Clinical & Experimental Dermatology*, 28(2), 134-137. • Wright J. (2001). www.worldwidewounds.com

Clinical Benefits of V.A.C.® Therapy:

- Can allow continuous wound healing without interfering with activities of daily living
- Assists granulation tissue development
- Applies controlled, localized negative pressure to help uniformly draw wounds closed
- Helps remove interstitial fluid allowing tissue decompression
- Helps remove infectious materials
- Provides a closed, moist wound healing environment ■

QUESTIONS OR COMMENTS?

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8

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Working with a Wound Healing Center to use advanced therapies

Wound Healing Centers are uniquely equipped to use new technologies in the treatment of wound patients. This helps primary care physicians (PCPs) avoid things like upfront costs associated with implementing new therapies or buying bioengineered tissue. Wound Healing Centers also have dedicated,

skilled physicians trained specifically in the use of new technologies. Wound Healing Centers offer follow-up education for PCPs and their patients using a database of outcomes.

Highlights of partnering with a Wound Healing Center:

■ Avoid upfront costs

- Avoid storage problems
- Experience dealing with extensive wound population
- More skilled physicians
- Follow-up patient education
- Outcomes database to track healing progress and keep physicians informed. ■

Negative pressure wound therapy synergistic with HBO

Synergistic combinations of negative pressure wound therapy (NPWT) and other modalities of treatment have evolved that dramatically improve wound healing outcomes. While there is limited research available, many case studies have been documented. For example, Niezgod (2005) writes that at his facility, adjustments to the HBO chamber were made to accommodate the V.A.C.® (KCI USA, Inc) device and its

attachments. NPWT and HBO together produced results that exceeded those produced when either was used alone. Twenty patients with compromised postsurgical wounds or wounds secondary to arterial insufficiency, matched for age and comorbid disease factors, were treated with NPWT alone (10 patients) or with NPWT and HBO together (10 patients). Achieving 100% wound granulation was used

as a study endpoint. Negative pressure wound therapy was used for an average of 58 days when implemented as a single modality. When HBO and NPWT were combined, use of NPWT was required, on average, for only 28 days. In addition, the average total HBO treatments also were diminished with combined NPWT and HBO (13 versus 18 treatments). ■



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