

# Skin Substitutes Useful in Deep Thermal Burns

BY PATRICE WENDLING  
Chicago Bureau

CHICAGO — The novel skin substitutes Suprathel and Matriderm resulted in complete healing and excellent functionality in patients with deep burns in two studies.

By using Suprathel, complete epithelialization was achieved in 14-20 days for 38 of 40 patients with deep dermal burns. Regrafting was necessary in only two patients, said Dr. David Lumenta, who presented the results on behalf of Dr. Lars-Peter Kamolz at the annual meeting of the American Burn Association. Both are with the division of plastic and reconstructive surgery at the Medical University of Vienna.

Average total body surface area burned (TBSA) was 35%, although the team has used Suprathel (PolyMedics Innovations GmbH, Denkendorf, Germany) in patients with burns up to 90% TBSA.

Suprathel is a resorbable skin substitute produced from a fully synthetic copolymer with a porous membrane, based largely (greater than 70%) on poly-DL-lactide. It is available in various pore and surface sizes and is indicated mainly for use on donor sites and partial-thickness burns.

Its main advantages are reduced pain, accelerated epithelialization, and employment in functionally stressed regions and joints. It is more easily handled than other biologic dressings, and there is no biological risk, Dr. Lumenta said. No signs of local or systemic allergic reaction were observed in the 40 patients.



A patient whose severe hand burns (left) were treated with Matriderm grafting showed free range of motion and good function at 1 year.

PHOTOS COURTESY DR. LARS-PETER KAMOLZ

In a poster at the same meeting, Dr. Kamolz reported their experience with Matriderm in 10 patients with severe hand burns.

Matriderm (Dr. Suwelack Skin & Health Care AG, Billerbeck, Germany) is a thin, porous membrane consisting of a native bovine type I, II, and V collagen-fiber template coated with elastin hydrolysate, which is converted into native host collagen within weeks of application, Dr. Kamolz said in an interview.

The matrix serves as a support structure for new cell growth while the collagen improves the stability and elasticity of the regenerating tissue. As healing progresses, fibroblasts produce their own extracellular matrix and Matriderm is resorbed. The main indications for this ma-

trix are full-thickness burns in functionally and aesthetically important regions, he said.

A two-step repair is recommended for Matriderm sheets 2 mm or greater in thickness, with a 7-day interval between matrix application and transplantation of split-thickness skin grafts to allow for vascularization of the matrix. A single operation is feasible in the acute phase after burn trauma using a 1-mm-thick sheet.

The take-rate using Matriderm does not differ significantly, compared with traditional split-thickness skin grafts, and the quality of the resulting scar has been superior, Dr. Kamolz said.

The take-rate was 97% at 3 months' follow-up among 10 patients, mean age 45 years, with severe, full-thickness hand burns (TBSA 23%) who underwent early debridement and immediate grafting with Matriderm and an unmeshed skin graft in a single operation.

The pliability of the grafted area was excellent, with a mean Vancouver Scar Scale score of 3.2. Full range of motion was achieved in all hands, he said.

No blisters and no unstable or hypertrophic scars were observed. In comparison with conventional skin grafts, the color of the skin grafts over the matrix appeared pale during the first few days, but no difference was observed after 2 weeks.

"These good functional and aesthetic results remain stable, even 12 months postoperatively," he reported.

The study was supported by the Medical University of Vienna. The investigators disclosed no relevant conflicts of interest. Neither product has been approved for use in the United States. ■

## Nephropathy Found to Predict Poor Diabetic Foot Outcomes

BY MARK S. LESNEY  
Senior Editor

An initially successful healing rate in patients who were hospitalized with diabetic foot ulcers did not lead to comparable long-term outcomes in a prospective study of 94 consecutive patients.

The presence of nephropathy was found to be an important predictor of poorer outcomes, whereas age was an independent predictor of global therapeutic success (GTS), according to a report presented in *Diabetes Care*.

Of 94 consecutive diabetic patients hospitalized for diabetic foot ulcers between January 1998 and December 2000, 89 (63 men) were successfully followed up for an average of nearly 80 months. The mean age of the patients was nearly 64 years.

Researchers calculated the rates of primary healing, new ulcers, amputations, mortality, and disability, and evaluated the GTS of foot care management (defined as primary healing without recurrence or disability at the end of follow-up). To their knowledge, this was the first time that disability and dependency, which were measured using Katz's index of activities of daily living, were considered as end points of a prospective diabetic foot study, according to Dr. Edouard Ghanassia and colleagues from the Centre Hospitalier Universitaire Montpellier (France).

Primary healing without major amputation occurred in 69 patients (nearly 78%). Amputations were performed in 39 patients (44%), with 30 minor and 9 major amputations; of the

minor amputations, 24 occurred in the primary healing group. Ulcers recurred in nearly 61% of patients. Ultimately, 46 patients (nearly 52%) died, including 23 from cardiovascular events.

At the end of the follow-up period, 25 patients (28%) were dependent and 40 patients (nearly 45%) had achieved GTS.

Using multivariate analysis, the researchers found that smoking and renal impairment were independent predictors of healing failure; an age older than 70 years was the only independent predictor of GTS. There were no independent predictors of disability.

Insulin treatment prior to admission was the only predictor of ulcer recurrence, and diabetic nephropathy was the only independent predictor of first amputation. The only independent predictors of cardiovascular mortality were insulin therapy before admittance and renal impairment.

Diabetic nephropathy was also seen to be an important marker of other factors in long-term prognosis, with impaired renal function being an independent predictor of healing failure and all-cause mortality; in conjunction with albuminuria, it was associated with amputations. Using univariate analysis, popliteal stenosis (diagnosed by Doppler ultrasound) was found to be an independent predictor of amputation, "confirming that vascular involvement in diabetic patients with foot ulcers is particularly important," the authors stated (*Diabetes Care* 2008;31:1288-92).

One limitation of the study, according to the authors, was that interview follow-up was conducted by telephone rather than in person. ■

## New Recommendations for Diabetic Foot Care Issued

BY MARK S. LESNEY  
Senior Editor

A simple protocol can assess the diabetic foot for the presence of predisposing factors for ulcerations and amputation, and can be used to guide treatment, according to recommendations developed by an American Diabetes Association task force.

The protocol consists of a history, general examination, and an assessment of dermatologic, musculoskeletal, neurologic, and vascular factors. Details of the protocol were issued by the American Diabetes Association, with the endorsement of the American Association of Clinical Endocrinologists, in a report by Dr. Andrew J. M. Boulton and his colleagues in a task force of the ADA's Foot Care Interest Group.

The history should explore previous foot ulceration or amputation, neuropathic or peripheral vascular symptoms, impaired vision, renal replacement therapy, and tobacco use.

Key components of the diabetic foot exam include dermatologic inspection for skin status, sweating, infection, ulceration, and calluses, as well as musculoskeletal inspection for deformity (claw toes, prominent metatarsal heads, Charcot's joint) or muscle wasting.

Neurologic assessment for loss of protective sensation (LOPS) should include the use of a 10-g monofilament test, with the device placed at specific points on the bottom of the foot while the patient's eyes are closed, as well as one of these additional tests:

- ▶ Vibration with 128-Hz tuning fork.
- ▶ Pinprick sensation.
- ▶ Ankle reflexes.
- ▶ Vibration perception threshold testing.

Vascular assessment using ankle brachial pressure index testing should be performed to determine the presence of peripheral arterial disease (PAD) in two groups of patients: those who are symptomatic (claudication, rest pain, or nonhealing ulcer) and those who have absent posterior tibial or dorsalis pedis pulses (*Diabetes Care* 2008;31:1679-85).

Patients assessed using the protocol should be assigned to a foot risk category from 0 to 3, with 0 being no LOPS, no PAD, and no deformity, 1 being LOPS with or without deformity, 2 being PAD with or without LOPS, and 3 being a history of ulcer or amputation.

Subsequent therapy and follow-up care should be provided according to the category: Primary care monitoring is appropriate for risk categories 0 and 1, and specialist care is indicated for risk categories 2 and 3. ■