A Novel Occlusive Dressing for Skin Resurfacing

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Resurfacing

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BACKGROUND. Over the last decade the benefits of occlusive
dressings have been appreciated. These dressings allow the epidermis
to resurface easier. The wound heals quicker.

OBJECTIVE. To evaluate a new silicone sheeting for immediate
post-op wound care. Our objective was to determine its benefit in
the wound care management after laser skin resurfacing.

METHOD. The silicone sheeting was applied immediately after
laser resurfacing in 35 individuals. This temporary skin replace-
ment was held in place with 4 × 4 gauzes and tube gauge
netting. Although the tube netting and the 4 × 4 gauzes were
changed daily the silicone sheeting remained in place for 4 or 5
days. Following this, applications of a petrolatum-based oint-
ment were continued for another 5 days. At day 10 the skin care
program was changed to a moisturizing sunscreen. Bleaching
cream was added at day 15 in darker complexed individuals.

RESULTS. The dressing accelerated wound healing. Pain and
swelling were minimized under the sheeting. Histologic exami-
nations demonstrated a more rapid reepithelialization at these
treated sites. Other than technical problems, such as the riding
up of the dressing over the jowels or retraction of the dressing
off the lips or off the eyelids, there were no adverse sequelae.
The wound healed rapidly and allowed the rapid progression to the
application of a moisturizer-sunscreen or a skin-bleaching
cream. Other than these technical problems there were no com-
lications. No wound infections were noted.

CONCLUSION. The use of silicone sheeting following skin resur-
facing facilitated a rapid reepithelialization of treated areas.
There was a remarkable reduction in erythema and edema ac-
companying the use of the dressing. The program made it pos-
sible for patients to return to work in 12–15 days. © 1998 by the
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Materials and Methods

After preconditioning the skin for 2–8 weeks with a vitamin
A/glycolic skin conditioning program, the skin was resur-
faced with the UltraPulse carbon dioxide (CO2) laser (Coher-

In private practice.
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ary, infected.7 Patients objected to the odor. A Saran
Wrap-like membrane (Omniderm; Omnitrack, Scientific
Ltd., Repton, Israel) became popular but is not readily
available or cost-effective.8 A meshed polyethylene mem-
brane (T-Neta; Winfield Labs, Dallas, TX) became the
most useful of the dressings for an exudative wound such as
a demaasuring or dermabration.9 However, it is dif-
ficult for N-tissue to stick on a dry wound such as a laser
wound. A plastic sheeting (Flexan; Dow B. Hickman, Inc.)
was advocated initially by Weinstein.10 This dressing is
great for small lesions but it is difficult to keep the dress-
ing in place during the healing of a full-face resurfacing.
A new dressing of silicone with a polytetrafluoroethylene inner
polymer network (Silon-TSR; Bio Med Sciences, Beth-
lehem, PA) is proving useful for healing the laser-induced
resurfacing.11 This dressing has the advantage of full-face
masks that can be left in place for 4 or 5 days. The dressing
captures the wound healing factors; shuts down the exu-
dative stage of wound healing; yet, allows visualization
through the dressing to examine the wound. This paper
will demonstrate our results utilizing this membrane over
our last 35 cases of partial or full-face laser resurfacing.
Table 1. Settings for Skin Resurfacing Using the UltraPulse CO₂ Laser

<table>
<thead>
<tr>
<th>Area</th>
<th>Energy (mJ)</th>
<th>Power (W)</th>
<th>Pattern</th>
<th>Size</th>
<th>Density*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glabrous skin</td>
<td>300</td>
<td>60</td>
<td>3</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>Eyelid skin</td>
<td>250</td>
<td>50</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

The laser was equipped with the computer pattern generator (CPG) handpiece.
* Avoid density settings of 7 or more.
† Also used for feathering.

ent, Palo Alto, CA). The Computer Pattern Generator (CPG) was used at the standard facial and eyelid settings (Table 1). Usually, three to four passes completed the resurfacing. The facial area was blotted dry and the Silon-TSR dressing applied. The facial mask was applied initially in the central face area and, then, extended out to the ears and tied behind the head with the drawstrings. This dressing was held in place with 4 x 4 gauze dressings covered with tube gauze. Small openings for the eyelid area, nostrils, and central lips were perforated through the silicone sheeting. The additional patch of Silon-TSR provided in the face mask kit was placed over the lip area to reinforce this covering as the sheeting tended to retract off this area (Figures 1 and 2). The patient was seen on the subsequent day to teach them how to change the 4 x 4 and tube gauze dressing and/or to patch any of the exposed areas with the silicone sheeting. After 5 days the dressing was removed and a moisturizing ointment (Aquaphor; Beiersdorf Inc., Norwalk, CT) was applied three or four times daily. Excess could be blotted off or washed with a mild soap (Cetaphil; Calderma Laboratories Inc., Ft. Worth, TX). By the 10th day a moisturizer-sunscreen was applied and by the 15th day a bleaching cream program could be instituted in Fitzpatrick Type 3 or darker skin.

Limited skin resurfacing of the scalp or around the eyes or mouth was dressed in a similar fashion. These limited one-half face dressings of Silon-TSR were held in place by a coat of Mastisol (Ferndale Laboratories, Inc., Ferndale, MI) applied next to the resurfaced area. Then, the dressing was held in place with tape (Figures 3 and 4). This dressing was also left in place for 4 or 5 days and, then the area was treated with ointments and moisturizers as described above.

Figure 1. The application of the Silon-TSR dressing. We usually apply the additional “patch” of silicone dressing to the lip area.

Some minor technical difficulties developed in approximately half of the cases. The Silon-TSR would ride up on the eyelid area or around the lip area. The patients were instructed to roll the Silon-TSR back into place with a cotton-tipped applicator or to apply the petrolatum-based ointment to keep exposed areas moist. If an area became uncovered, an additional Silon-TSR patch was often added to the area to keep the occlusion for the 5 days. Occasionally, the patient would become disgruntled with the occlusive dressing after 3 or 4 days and remove it. We either reapplied a new Silon-TSR face mask or allowed the patient to move into the ointment dressing phase prematurely.

Two punch biopsies were taken from treated and untreated sites after 5 days of wound healing in three patients. The biopsies were placed in formaldehyde, embedded in par-

Figure 2. The Silon-TSR dressing held in place with 4 x 4s and tube gauze. Note the cotton balls compressing the Silon-TSR dressing around the bridge of the nose.

Figure 3. A partial facial resurfacing of the eyelid area treated with the Silon-TSR dressing. The Silon-TSR is held in place with Mastisol and paper tape for 4-5 days.
affin, cut at six μm, and stained with hematoxylin-eosin for microscopic examination (100×).

Results

There was a lack of pain and the reduction in swelling under the dressing. If the dressing came off the lips, the jawline, or eyelid area, the patients immediately complained of pain and swelling developed from the exposure to the air. They were immediately relieved when a silicone patch was put back in place. There was a rapid progression of wound healing under the dressing. The erythema was minimum and the wound closed in 5–7 days. Both the physicians and the patients noted the lack of exudate in the treated sites. The adjacent exposed areas developed a thick crust that was difficult to manage. The occluded site had essentially no film under the dressing (Figure 5).

Biopsies of the treated and untreated areas showed a remarkable difference (Figures 6 and 7). The occluded area demonstrated a mature epidermis, a compact dermis, and lack of inflammatory infiltrate. The unoccluded area demonstrated a disorganized epidermis, a very swollen, pale dermis, and an active inflammatory cell infiltrate. This edema and inflammatory response may have been responsible for the exudative phenomenon noted at the untreated sites.

Compared with patients only using ointment-based dressings, these patients noted less troublesome erythema and edema after the 10-day wound healing period. They were able to put on their makeup and go back to work or apply their bleaching creams at day 14 or 15 (Figures 8).

There were no complications other than the technical ones of keeping the dressing in place. There were no instances of persistent erythema, bacterial infections, or skin texture changes when the resurfaced skin was treated with the Silon-TSR occlusive dressing.

Figure 5. Note the exudative “build up” that developed in the exposed area after the Silon-TSR slipped off.

Figure 6. The Silon-TSR treated site. The reepithelialization is complete. Note the compact dermis and lack of inflammatory response (×100).

Figure 7. The untreated site. There is limited reepithelialization and the dermis is pale and edematous. An active inflammatory reaction is present (×100).
Figures 8. A) Before and B) after skin resurfacing. With the application of the Silon-TSR dressing, there is minimal erythema and edema. The patient was back to work in 14 days without makeup.

Discussion

In teaching the stages of wound healing, authors state that the exudative stage is necessary for the progression onto the reepithelialization and remodeling phases.\(^\text{12}\) In our experience, however, it was quite beneficial to shut down this exudative phase of wound healing. If we keep the wound occluded there was less exudate, less edema, and more rapid wound healing. We feel the exudative phase of wound healing is one to avoid. We have seen no benefit from the development of these thick crusts. The necessity for the "complete" wound healing cycle disappears in the presence of the silicone sheeting.

With this disappearance of the exudative phase of wound healing, the pronounced erythema following laser resurfacing did not develop or disappeared much more rapidly. Clinically, the erythema in the occluded areas was one-half as intense as the erythema in open areas. As we gained more experience with the Silon-TSR dressing, we felt more confident with the laser resurfacing method and found that we could complete an extra pass over areas of wrinkles or increase the density of the CPG to extend the wound deeper to obtain a more beneficial clinical result without difficulties (Table 2).

### Table 2. Silon-TSR: Silicone Semi-occlusive Dressing

<table>
<thead>
<tr>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of management, rapid</td>
<td>Difficult to keep around orifices</td>
</tr>
<tr>
<td>application</td>
<td></td>
</tr>
<tr>
<td>Less exudative wound healing</td>
<td>May be too occlusive for exudative wounds</td>
</tr>
<tr>
<td>Less painful, less erythema</td>
<td>Potential for increased bacterial growth*</td>
</tr>
<tr>
<td>Nonadherence to wound</td>
<td>Some patients can’t tolerate a &quot;mask&quot;</td>
</tr>
<tr>
<td>Traps natural growth factors</td>
<td></td>
</tr>
<tr>
<td>Can visualize wound</td>
<td></td>
</tr>
<tr>
<td>Rapid reepithelization</td>
<td></td>
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</tbody>
</table>

* Does not appear to be clinically significant.

References