

# Corrective Cosmetics Are Effective for Women With Facial Pigmentary Disorders

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*Visible facial lesions are a common and burdensome skin problem. This study examines the impact of corrective cosmetics in women with severe facial pigmentary disorders. Enrollment consisted of 73 women with one or more of the following conditions: acne, dermatosis papulosis, hypopigmentation, lentiginos, melasma, rosacea, vascular proliferations, or other facial scars. The corrective cosmetic (Dermablend®) was applied at the initial visit, at which time instructions and a supply of product were provided. Assessments were conducted at baseline, 2-week, 4-week, and 3-month follow-up visits on 63 patients using the Skindex-16. The corrective cosmetic was well tolerated. There was improvement in Skindex-16 scores after application of the corrective cosmetic, which continued at each follow-up visit and after adjustment for baseline confounders using multiple regression analyses. At 3 months, there was a 30% improvement in*

*Skindex-16 score ( $P < .001$ ). The corrective cosmetic was well tolerated and represents a valuable option that dermatologists can offer to patients with these conditions.*

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Within dermatology, several disorders can be grouped under the broad term *severe facial pigmentary disorders*. These disorders have significant effects on a patient's self-image but small effects on a patient's overall health; additionally, these disorders have similar long-term courses. The group of disorders includes angioma, melasma and other hyperpigmentary disorders, port-wine stains, vitiligo, and facial scars. Pigmentary disorders often are most apparent in those with nonwhite skin and may cause particularly severe consequences on the self-concept of these patients.<sup>1</sup>

Although severe facial pigmentary disorders rarely affect the physical health of a patient, the psychosocial aspects of these diseases almost always affect the patient's general health. The disorders can lead to feelings of isolation and loneliness. For many people, pigmentary disorders are an everyday problem they must put up with because medical or surgical treatments are limited. The pigmentary effects of these disorders are unpleasant enough to affect patients' physical, social, and psychological well-being.<sup>2,3</sup>

Several studies have investigated the psychosocial impact of port-wine stains.<sup>4,6</sup> Patients with port-wine stains report the condition has a negative impact on their professional and social interactions,<sup>4</sup> often causing them to avoid sexual contact; envy people with normal skin; and feel embarrassment, anxiety, or depression.<sup>5,6</sup> Vitiligo patients have reduced self-esteem compared with

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matched controls, as do patients with psoriasis.<sup>7</sup> Patients with vitiligo report social unease, difficulty in sexual relationships, and embarrassment.<sup>8-10</sup>

Cosmetic camouflage can be used to cover disfiguring lesions, but its benefit is difficult to evaluate objectively. Cosmetic camouflage has been considered a good option for patients because it is inexpensive, easy to learn how to apply, and carries little risk to the patient.<sup>11</sup> The basic principles of cosmetic camouflage application are derived from stage makeup texts.<sup>12</sup> These concepts include covering facial pigmentation defects with an opaque foundation, blending complementary colors to improve camouflage, and contouring to minimize areas of atrophy or hypertrophy.<sup>12</sup>

The corrective cosmetic can be used for a wide variety of conditions that affect the color of the skin, including angiomas, birthmarks, leukoderma, lupus erythematosus, port-wine lesions, postoperative sequelae, scars, and vitiligo. We evaluated the effect of a corrective cosmetic on the quality of life (QOL) of patients with disfiguring facial color disorders. The evaluation included only severe pigmentary disorders, namely angioma; facial scars; hyperpigmentary conditions such as severe, equally distributed melasma; and vitiligo.

## Materials and Methods

**Subjects**—Seventy-three women were recruited and identified by an investigator as having significant disfiguring facial color disorders defined as being visible from a distance of at least 5 feet. The study was approved by the Wake Forest University School of Medicine Institutional Review Board. Participants were recruited from the clinic population and the community.

**Materials**—The women completed a comprehensive psychosocial assessment battery before use of the corrective cosmetic (Dermablend®). The cosmetic is available in a variety of shades designed to match a person's natural skin color. It is applied to the skin to cover unsightly blemishes. It does not affect the structure or physiologic function of the skin, is noncomedogenic, and has no known risks. The product consists of a cover cream used in conjunction with a setting powder. The setting powder is micronized and thus intensifies the hold of the cover cream for up to 16 hours.

**Methods**—At the baseline visit, a licensed cosmetologist who works with corrective cosmetics taught the patients how to apply the product. The assessments were repeated at 2-week, 4-week, and 3-month follow-up visits. Sixty-three patients completed the final 3-month follow-up; 8 patients did not return and could not be contacted for

follow-up visits, and 2 patients dropped out, citing incompatibility with the corrective cosmetic. The investigator also obtained photographs before and after application of the corrective cosmetic at the baseline visit. Because patients would most likely be unfamiliar with the application of the product at the baseline visit, the investigator also obtained photographs after 2 weeks of application.

Data on demographics, disease severity, medical history, dermatologic history, and current facial medications were collected. To assess the severity of the facial pigmentary disorder, we used the Blemish Area and Severity Index, which is based on the Melasma Area and Severity Index.<sup>13</sup> The Blemish Area and Severity Index score ranges from 0 to 40 and comprises 4 domains: vascularity, texture, pigmentation, and area of involvement.<sup>13</sup>

The impact of the skin lesions was assessed with the Skindex-16.<sup>2,3</sup> Each item on the Skindex-16 is rated on a scale from 1 to 7 for a total score of 16 to 112, with a higher score indicating greater burden of disease. The degree to which people experience apprehension and fear of being negatively evaluated by others was assessed using the fear of negative evaluation (FNE) scale.<sup>14</sup> Each of the 12 items on the scale is rated 1 to 5 for a total score of 12 to 60, with a higher score indicating greater fear of negative evaluation. In addition, we created a measure of the perception that QOL would be better without the facial blemish. On this measure, patients rated overall QOL with the facial blemish and perceived QOL without the facial blemish on 8 subscales—work, family relationships, social life, sexual relationships, recreation and leisure, physical health, money matters, and emotional well-being. For each patient, the difference between QOL with and without the facial blemish provided an idea of the patient's perception of increased QOL without the facial blemish (score range, 0–40).<sup>15</sup> Worry due to skin discoloration was assessed using a specially formulated 7-item scale.<sup>16</sup> We also assessed each patient's satisfaction with the corrective cosmetic using a 7-point Likert scale where 1 equaled extremely satisfied and 7 equaled extremely unsatisfied.

**Statistical Analysis**—We compared differences between baseline and follow-up outcomes in the 63 patients who completed the study using a confounder-adjusted multivariate regression analysis model.<sup>17</sup> The outcomes that were examined included Skindex-16 scores, FNE scores, QOL perception with and without facial blemish, and worry about skin discoloration. We adjusted the models for the following confounders: baseline age, race, presence of comorbidities, and the Blemish Area

Table 1.

**Baseline Characteristics of the Study Population (n=63)**

Variable	Mean	Standard Deviation* (Range)
<b>Demographics</b>		
Age of patient, y	37.7	6.6 (19–46)
Race of patient, %		
White	50.8	
Black	41.3	
Hispanic	4.8	
Other	3.1	
Married, %	52.4	
Employed, %	71.4	
College education, %	68.3	
Low income (<\$20,000/y), %	30.2	
<b>Clinical variables</b>		
History of acne/rosacea comorbidity, %	25.4	
Endocrine disorders, %	3.2	
Other comorbidity, %	9.5	
Psychiatric comorbidity, %	30.2	
Blemish Area and Severity Index score	3.94	4.08 (0.10–18.23)
<b>Behaviors, %</b>		
Use of any medications	65.1	
Use of makeup	4.8	
Significant time spent outdoors ( $\geq 6$ h/wk)	33.3	
Significant use of sunscreen devices	54.0	
Use of foundations	90.5	
Use of therapeutic treatments	61.9	
<b>Diagnosis, %<sup>†</sup></b>		
Acne	14	
Facial scars	22	
Hyperpigmentation	16	
Hypopigmentation	3.2	
Lentigines	3.2	
Lentigo	3.2	
Melasma	33	
Nevus	4.8	
Port-wine stain	3.2	
Rosacea	6.4	

\*Presented where applicable.

<sup>†</sup>Does not add up to 100% because some patients had multiple conditions.

and Severity Index score. Adjusted means in the outcome variables were obtained after adjustment for the confounders. We used paired *t* tests to compare the adjusted means for significant differences with baseline. All statistical analyses were conducted using Stata statistical software for professionals.<sup>18</sup>

**Results**

**Subjects**—Table 1 lists the baseline characteristics of our study population (n=63). Mean age of survey completers was 37.7 years (range, 19–46 years). Half of the patients were nonwhite. In all, 33% of the patients had melasma, 22% had facial scars, 14% had acne, and 16% had hyperpigmentation; the number of patients with other types of facial pigmentary disorders was small. Presence of a facial blemish also was associated with many patient behaviors intended to alleviate the impact of the condition.

**Outcome Variables**—Table 2 outlines the baseline and follow-up scores in the outcome variables in the study population. A facial pigmentary disorder was associated with significant impairment in overall QOL, as evidenced by the mean baseline Skindex-16 score of 59.8 (out of a possible 112, with a higher score indicating worse QOL). Similarly, FNE scores and perceptions of increased QOL without melasma also were of considerable magnitude. There were dramatic improvements observed in the study outcome variables in the follow-up visits. The Skindex-16 scores dropped by nearly 20 points (30%), and remained at that level at the end of the 12-week study, indicating reduced burden of condition after the use of corrective cosmetics. There was an 8% reduction in the FNE score in the second week, which also persisted until the end of the study. The QOL perception without disease and worry over skin discoloration scores

Table 2.

**Changes in Study Outcomes Before and After Application of Corrective Cosmetic\***

	Baseline Mean	First Follow-up (2 wk) Mean	Second Follow-up (4 wk) Mean	Third Follow-up (12 wk) Mean
Skindex-16 score (16=best QOL, 112=worst QOL) <sup>†‡</sup>	59.8	41.9	38.2	40.2
FNE score (12=lowest, 60=highest) <sup>§</sup>	37.6	34.5	34.0	33.6
Increased QOL perception without disease (0=none, 20=maximum) <sup>  </sup>	4.2	1.9	1.6	1.4
Worry over skin discoloration (0=lowest, 21=highest) <sup>†</sup>	8.8	3.9	4.3	4.7
Satisfaction with corrective cosmetic (1=extremely satisfied, 7=extremely unsatisfied)	NA	2.1	1.8	2.0

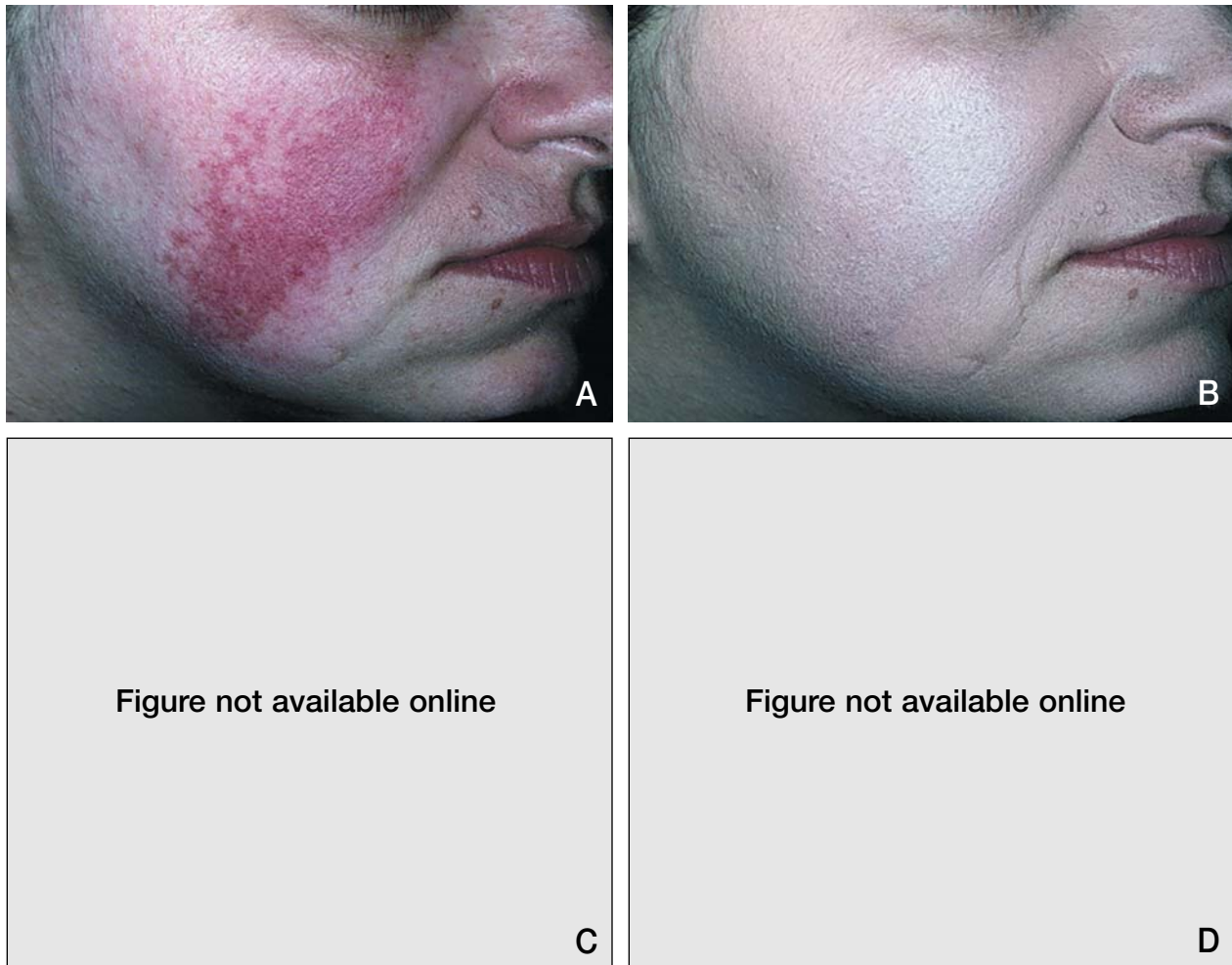
\*QOL indicates quality of life; FNE, fear of negative evaluation; NA, not applicable.

<sup>†</sup>Mean of paired differences between baseline and first follow-up is significantly different from zero at  $\alpha=.001$  after confounder adjustment.

<sup>‡</sup>Mean of paired differences between first follow-up and second follow-up is significantly different at  $\alpha=.01$  after confounder adjustment.

<sup>§</sup>Mean of paired differences between baseline and first follow-up is significantly different from zero at  $\alpha=.01$  after confounder adjustment.

<sup>||</sup>Mean of paired differences between baseline and first follow-up is significantly different from zero at  $\alpha=.05$  after confounder adjustment.



**Figure 1.** Patient with vascular malformation pretreatment (A) and posttreatment (B) with corrective cosmetic. Patient with vitiligo pretreatment (C) and posttreatment (D) with corrective cosmetic.

also dropped by more than 50%, indicating better coping with the condition. In addition, patients demonstrated high satisfaction with the corrective cosmetic, with most reporting being very satisfied or extremely satisfied with it. There was good tolerance with the corrective cosmetic; 2 patients dropped out of the study because they believed the cosmetic appeared too thick on their skin. It should be noted that all these differences observed in the second-week follow-up period were statistically significant after the adjusted means were compared with each other ( $P < .00$ ).

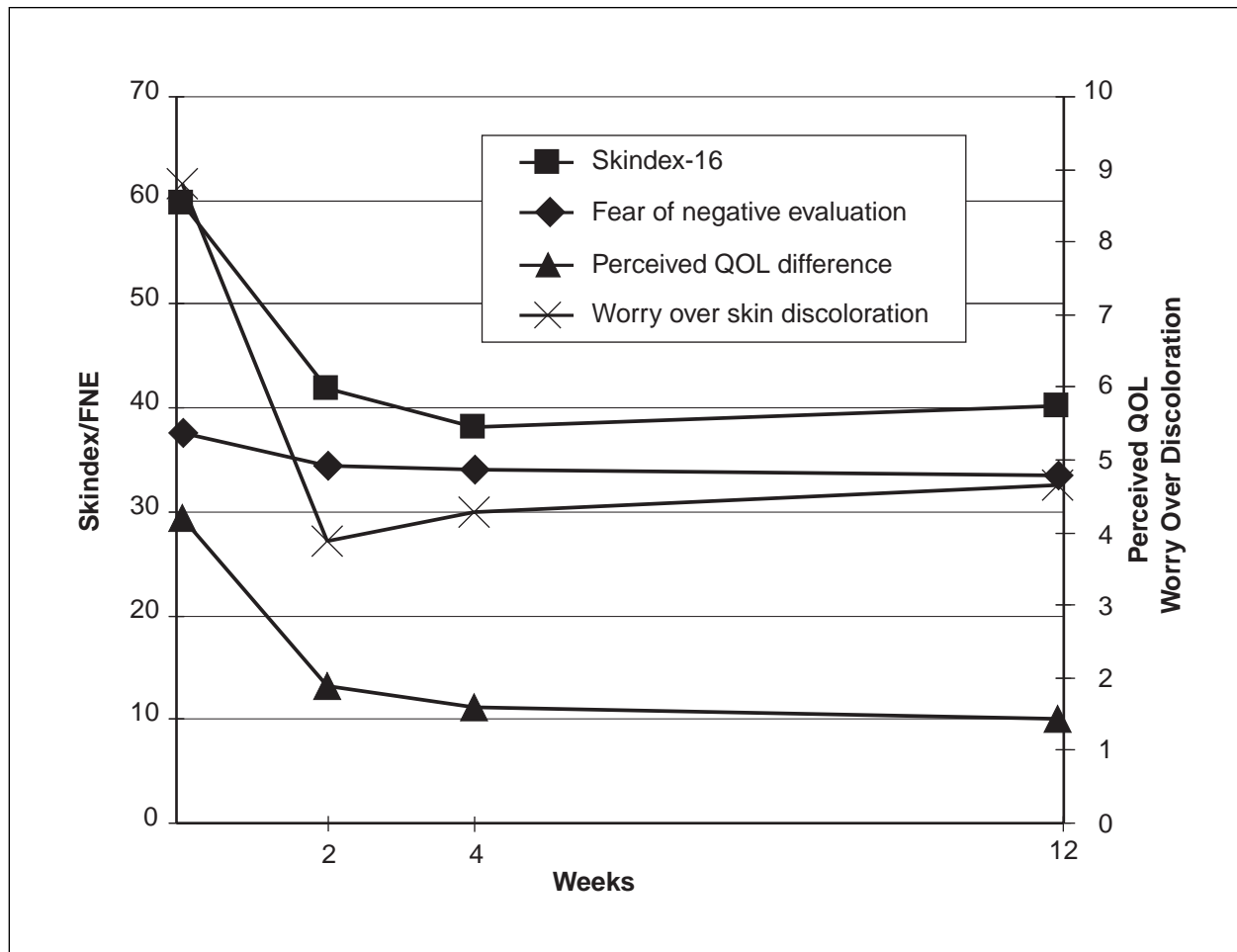
Figure 1 shows examples of patients before and after application of the corrective cosmetic. It should be noted that the improvement in facial appearance is dramatic in most cases. Figure 2 presents the adjusted means of the study outcome variables. Dramatic decreases are observed in the burden of skin disease on various psychosocial

outcomes, with the most notable decrease being in the Skindex-16 outcome.

### Comment

Corrective cosmetics are an attractive option for pigmentary disorders. The wide variety of shades available allow a close match of normal skin color across a broad array of human skin colors. There is immediate improvement in skin appearance, and there are no significant adverse effects. In this study, the corrective cosmetic was well tolerated, and patients reported high satisfaction rates. We found that QOL was improved even in patients who had contour defects (seen in the patients with scars) as part of their pigmentary disorder.

Our study was designed to assess both the early impact of corrective cosmetic use (at 2 weeks) and a longer-term effect (at 3 months). Proper application of the corrective cosmetic is a 2-step procedure.



**Figure 2.** Adjusted mean profiles of study outcomes. The improvement in quality of life (QOL) associated with corrective cosmetic treatment of facial pigmentary disorders was assessed using the Skindex-16, perceived QOL difference, and worry over skin discoloration. All 3 measures showed improvement at the 2-week follow-up visit, with maintenance of that improvement over the 3-month study period. Fear of negative evaluation (FNE), which is thought to represent a relatively nonchanging psychological trait, also improved slightly with treatment. Means were adjusted for age, race, Blemish Area and Severity Index score, and presence of comorbidities.

We had hypothesized that patients would grow accustomed to using the corrective cosmetic over time; we also recognized that patients could become less tolerant of its use over time. We found the corrective cosmetic resulted in rapid improvement, and this improvement was maintained consistently throughout the 3-month study period. Corrective cosmetics offer women with facial pigmentary disorders rapid improvement in appearance and in QOL that appears to persist with continued use.

An unexpected finding was the statistically significant improvement in the FNE ( $P < .0001$ ). This improvement was considerably lower in magnitude than the Skindex-16 outcome but is a dramatic finding considering that FNE is considered a fixed psychological trait that reflects how concerned people are

by how they believe they are perceived by others. The significant change in FNE shows the considerable impact of facial pigmentation disorders and the ability of corrective cosmetics to improve patients' psychosocial outcomes. Cosmetic cover-up treatment of facial pigmentary disorders is a valuable option dermatologists can offer to patients with these conditions.

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