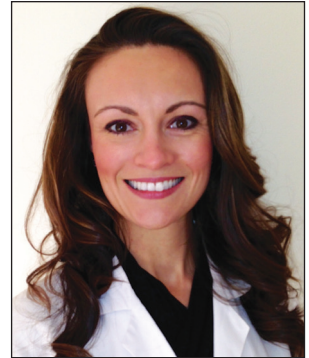


# Completeness of Facial Self-application of Sunscreen in Cosmetic Surgery Patients

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## RESIDENT PEARL

- Patients may benefit from their physician taking a moment to describe the importance of applying sunscreen to the eyelids while applying it to the rest of the face.

*Previous studies have demonstrated incomplete sunscreen self-application to various facial regions in cosmetic surgery patients, but there is no scientific research on the completeness of facial and periocular sunscreen self-application using ultraviolet (UV) photography for assessment. This prospective, cross-sectional, qualitative study aimed to assess completeness of facial application of sunscreen in oculo-facial surgery patients at the Duke Eye Center (Durham, North Carolina). Forty-four participants were enrolled, and completeness of facial sunscreen self-application was assessed using UV photography.*

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Drs. Langelier, Liss, and Stinnett report no conflict of interest. Dr. Woodward is on the advisory board for EltaMD and SkinCeuticals. This case was part of a presentation at the 8th Cosmetic Surgery Forum under the direction of Joel Schlessinger, MD; November 30-December 3, 2016; Las Vegas, Nevada. Dr. Langelier was a Top 10 Fellow and Resident Grant winner.

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UV radiation from sun exposure is a risk factor for most types of skin cancer.<sup>1</sup> Despite comprising only 1% of the body's surface area, the periocular region is the location of approximately 5% to 10% of skin cancers described in one US study.<sup>2</sup> The efficacy of sunscreen in preventing skin cancer is widely accepted, and the American Academy of Dermatology recommends application of broad-spectrum UVA/UVB sunscreen with a sun protection factor of 30 or higher to help prevent skin cancer.<sup>3-5</sup>

Reducing the risk of skin cancer from sun exposure relies on many factors, including completeness of application. A number of studies have demonstrated incomplete sunscreen application on the hairline, ears, neck, and dorsal feet.<sup>6-8</sup> The purpose of this study was to assess the completeness of facial sunscreen self-application in oculo-facial surgery patients using UV photography.

## Methods

This single-site, cross-sectional, qualitative study assessed the completeness of facial sunscreen self-application among patients from a single surgeon's (J.A.W.) cosmetic and tertiary-care oculo-facial surgery practice at the Duke Eye Center (Durham, North Carolina) between March 2016 and May 2016. Approval from the Duke University institutional

review board was obtained, and the research adhered to the tenets of the Declaration of Helsinki and complied with the Health Insurance Portability and Accountability Act. Informed consent was obtained from all patients, and patients could elect to provide specific written consent for publication of photographs in scientific presentations and publications. Patients younger than 18 years of age; those with known sensitivity to sunscreen or its ingredients; and those with an active lesion, rash, or open wound were excluded from the study.

After obtaining informed consent, patients were photographed using a camera with a UV lens in natural outdoor lighting, first without sunscreen and again after self-application of a sunscreen of their choosing using their routine application technique. Completeness of sunscreen application was graded independently by 3 oculofacial surgeons (N.A.L., J.L., J.A.W.) as complete, partial, none, or cannot determine for 15 facial regions. The majority response was used for analysis.

## Results

Forty-four patients were enrolled in the study. Six patients were disqualified due to use of mineral-based formulations (zinc oxide and/or titanium dioxide), as these sunscreens could not be visualized

using UV photography. The age range of the remaining 38 patients was 28 to 74 years; 26% (10/38) were men and 74% (28/38) were women.

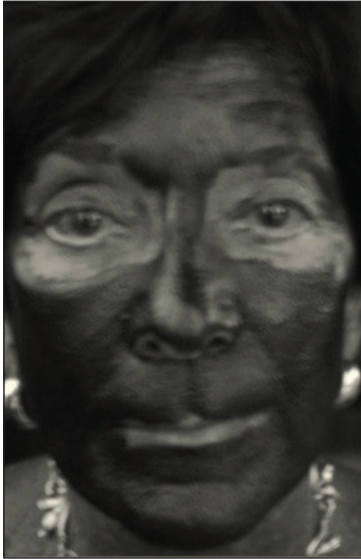
Complete sunscreen application was most frequently performed on the cheeks (97% [37/38]), chin (95% [36/38]), forehead (92% [35/38]), and temples (92% [35/38]). Complete absence of sunscreen coverage was most common on the lower eyelid margin (84% [32/38]), upper eyelid margin (82% [31/38]), medial canthus (71% [27/38]), and upper eyelid (66% [25/38])(Table)(Figure).

## Comment

UV radiation–related skin cancers frequently occur in the periocular area, presumably because it is a frequent site of UV exposure. Clothing, sunglasses, and hats can be used to aid in protection from UV radiation, but these products are only regulated by the US Food and Drug Administration if the product claims to prevent skin cancer. Sunscreen is a proven method of protection from UV radiation and the prevention of skin cancer but must be properly applied for it to be effective.<sup>1,2,5,6</sup> Incomplete sunscreen application has been demonstrated in numerous studies. Lademann et al<sup>7</sup> studied sunscreen application among 60 beachgoers in Germany and found they typically missed the hairline, ears, and dorsal

### Sunscreen Coverage by Facial Area as Assessed With UV Photography (N=38)

Facial Area	Level of Sunscreen Coverage, n (%)			
	Complete	Partial	None	Cannot Determine
Cheeks	37 (97)	1 (3)	0 (0)	0 (0)
Chin	36 (95)	1 (3)	1 (3)	0 (0)
Forehead	35 (92)	3 (8)	0 (0)	0 (0)
Temples	35 (92)	2 (5)	1 (3)	0 (0)
Glabella	32 (84)	5 (13)	1 (3)	0 (0)
Nose	31 (82)	7 (18)	0 (0)	0 (0)
Hairline	29 (76)	6 (16)	2 (5)	1 (3)
Lips	21 (55)	14 (37)	3 (8)	0 (0)
Lateral canthus	12 (32)	11 (29)	14 (37)	1 (3)
Eyebrow	11 (29)	22 (58)	4 (11)	1 (3)
Lower eyelid	8 (21)	17 (45)	12 (32)	1 (3)
Upper eyelid	7 (18)	5 (13)	25 (66)	1 (3)
Lower eyelid margin	2 (5)	3 (8)	32 (84)	1 (3)
Upper eyelid margin	1 (3)	1 (3)	31 (82)	5 (13)
Medial canthus	1 (3)	10 (26)	27 (71)	0 (0)



Visualization of sunscreen self-application in a cosmetic surgery patient using UV photography showing incomplete coverage of all periocular areas with partial coverage on the eyebrows and lips.

feet. In a study of 10 women with photosensitivity in England who were asked to apply sunscreen in their routine manner, Azurdia et al<sup>6</sup> found the posterior neck, lateral neck, temples, and ears, respectively, were the most frequently missed sites. Yang et al<sup>8</sup> assessed sunscreen application in 39 dermatologists and 41 photosensitive patients in China and found the neck, ears, dorsal hands, hairline, temples, and perioral region, respectively, were most commonly left unprotected.

Our study investigated detailed facial self-application of sunscreen and found excellent coverage of the larger facial units such as the forehead, cheeks, chin, and temples. The brow, medial canthus, lateral canthus, and upper and lower eyelids and eyelid margins were infrequently protected with sunscreen during routine application. Our opinion is that patients are unaware that eyelid sunscreen application is important. They may be afraid that the products will sting or cause damage if they get in the eyes. Although some products do sting if they get into the eyes, there is no evidence that sunscreens cause injury to the eyes. The US Food and Drug Administration does not have clear guidelines about applying sunscreens in the periocular area, but in general, mineral blocks are recommended because they have less chance of irritation. Several

companies make such products that are designed to be applied to the eyelids.

Limitations of our study included a small sample size and a majority female demographic, which may have affected the results, as women generally are more familiar with the application of lotions to the face. Additionally, the patients were recruited from a tertiary-care clinic and may have had periocular malignancy or may have previously received counseling on the importance of sunscreen use.

## Conclusion

Cancer reconstruction of the periocular area is challenging, and even in the best of hands, a patient's quality of life may be negatively affected by postreconstructive appearance or suboptimal function, resulting in ocular exposure. The authors recommend counseling patients on the importance of good sun protection habits, including daily application of sunscreen to the face and periocular region to prevent malignancy in these delicate areas.

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