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SUMMARY OF "OCCURRENCE OF NONMELANOMA SKIN CANCERS ON THE HANDS AFTER UV NAIL LIGHT EXPOSURE"

This "**OBSERVATION**" was published in 2009 by Deborah F. MacFarlane, MD and Carol A. Alonso, MD. This was the first time anyone questioned whether the UVA radiation being emitted from the nail lamps could cause damage to the skin, or even worse, skin cancer. Please note this particular **OBSERVATION** was meant to be just that...an Observation. The doctors never claimed to have conducted any scientific calculations, nor did they have a large focus group. In fact, it was only 2 older women who happened to have in common using the UV nail lamps.

Their conclusion, based on a faulty comparison between the nail lamps and tanning booths, made this Observation easy to dismiss. However, it did open the door to the question as to what effect the UVA radiation could have on the skin of the customer. While customers waffled on whether to do gel manicures or not to do gel manicures, the Nail Manufacturers Council stepped in to provide evidence of their own. These studies will follow.

For now, here is the **OBSERVATION.**

OBSERVATION

Occurrence of Nonmelanoma Skin Cancers on the Hands After UV Nail Light Exposure

Deborah F. MacFarlane, MD, MPH; Carol A. Alonso, MD

Background: Exposure to tanning beds, which contain mostly high-dose UV-A emitters, is a known cause of photoaging. Evidence is also accumulating for an association between tanning bed use and the development of skin cancer. Another source of high-dose UV-A is UV nail lights, available for use in the home and in beauty salons.

Observations: Two healthy middle-aged women with no personal or family history of skin cancer developed nonmelanoma skin cancers on the dorsum of their hands. Both women report previous exposure to UV nail lights.

Conclusions: It appears that exposure to UV nail lights is a risk factor for the development of skin cancer; however, this observation warrants further investigation. In addition, awareness of this possible association may help physicians identify more skin cancers and better educate their patients.

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THE VARIOUS DERMATOLOGIC hazards associated with a visit to the nail salon are well documented. Irritant contact dermatitis may occur after exposure to nail solvents, such as toluene and formaldehyde, in nail enamel and to acetone in nail polish remover.[1] The acrylates found in artificial nails and toluene sulfonamide formaldehyde resin in nail enamel are often causes of allergic contact dermatitis.[2,3] Nail brittleness, onycholysis and paronychia, discoloration, and transverse leukonychia have been associated with salon manicures and pedicures.[4-7] Furunculosis of the lower extremities has been observed by nail salon customers after footbaths and pedicures.[8-12] In this article, we discuss another potential dermatologic hazard associated with nail cosmetics: the development of skin cancer after exposure to UV nail light.

REPORT OF CASES

CASE 1

A 55-year-old white woman in good health who was not taking immunosuppressive medications, who had an indoor occupation, little recreational UV exposure, and no personal or family history of skin cancer had an erythematous plaque on the dorsomedial aspect of her right index finger (**Figure 1**). The patient had Fitzpatrick skin type III, with no sign of solar damage to her face or the rest of her body. There was no preceding human papillomavirus infection at this site or elsewhere. Biopsy (hematoxylin-eosin) revealed a squamous cell carcinoma in situ, and 3 stages of Mohs surgery were required to clear the tumor. The area healed by secondary intention. The patient had a 15-year history of twice-monthly UV nail light exposure to dry her nail polish and set her acrylic nails.

CASE 2

A 48-year-old white woman, similarly in good health, not taking immunosuppressive medications, with an indoor occupation, moderate recreational UV exposure, and no personal or family history of skin cancer, had a scaly papule on the dorsum of her right hand. The patient had Fitzpatrick skin type III, with several actinic keratoses on her face and arms. There was no preceding human papillomavirus infection at this site or elsewhere. Biopsy (hematoxylin-eosin) revealed a squamous cell cancer that was later excised using 1 stage of Mohs surgery. A previous squamous cell cancer had been excised from the dorsum of the left finger of the patient 3 years earlier (**Figure 2**). During the next 4 years, the patient had 2 further squamous cell cancers on the dor-

Author Affiliations: Departments of Dermatology and Plastic Surgery, The University of Texas M. D. Anderson Cancer Center, Houston (Dr MacFarlane); and Department of Dermatology, The University of Texas Medical School, Houston (Dr Alonso).

Figure 1. Squamous cell carcinoma in situ on the dorsal aspect of the right index finger.

Figure 2. Squamous cell carcinoma on the ulnar aspect of right dorsal hand. Note the full-thickness skin graft on the base of the left index finger from a previous squamous cell carcinoma.

sum of both hands that had been treated with Mohs surgery. Questioning revealed previous exposure to UV nail lights approximately 8 times in 1 year several years before her first skin cancer.

COMMENT

Artificial nails are an increasingly popular cosmetic augmentation to the natural nail. Nail salons brought in $1.9 billion in 2005 according to US Census Bureau figures.[13] Different systems available include acrylic nails, UV gel nails, fiber wraps, and preformed artificial nails.[14]

A common piece of equipment found in almost all nail salons is the UV nail lamp. This device is also widely available for purchase on the Internet for use at home. The UV emitted from the nail lights is predominantly UV-A, similar to tanning beds, which are, on average, 95% UV-A and 5% UV-B.[15] Most nail lamps produce from 4 W to 54 W of power, depending on the model (as seen on trading sites www.alibaba.com and www.tradekey.com).[16] Most home tanning beds have 12 to 28 bulbs producing 100 W per bulb, and salon beds have 24 to 60 bulbs producing 100 to 200 W per bulb.[16] Most tanning beds can produce 1200 W of power or more, depending on the model. When correcting for body surface area (100% body surface area while using a tanning bed and 2% body surface area with a nail lamp), the amount of UV radiation per meter squared is approximately comparable, unless one is using a super tanning bed with 60 lamps putting out 200 W per bulb.

Internet marketing materials claim that the lamp will clean nails, kill residual bacteria, and make nails healthier. The UV nail lamp is most commonly used to cure UV gel nails, but it is also used for UV-cured acrylic nails and nail fill-ins, and to dry traditional nail polish and, more recently, for "UV top sealers," or topcoats formulated to protect the nail. It may also be used to dry nail polish in pedicures. Because exposure to the UV light from tanning beds may cause nails to yellow and nail polish to fade, more tanners are now using UV-protective topcoats to safeguard their nails before tanning. Such topcoats may, in turn, entail the use of UV nail lamps, and some tanning salons offer this service. There are, therefore, a variety of uses for the UV nail lamp.

The traditional acrylic nail is "glued on" via a 2-part system consisting of a liquid (the monomer) and a powder (the polymer), which are mixed together. The nail can dry with or without UV light exposure.

The UV gel system is a popular choice owing to its natural appearance, flexibility, and added high-gloss shine. In addition, the virtual lack of odor makes UV gel systems popular in beauty salons.[14] The UV gel system is popular in Europe and is becoming increasingly popular in the United States. The process involves applying a premixed gel acrylic to the nails, followed by curing the nails under UV light.[17] The acrylic polymer is cross-linked by the action of the UV light. This technique has been around for more than 20 years and consists of applying approximately 3 separate coats of gel, followed by curing each nail under UV light for 3 minutes after each coat. Nail fill-ins are often required every 2 to 3 weeks as the natural nail grows out, and the nails are typically replaced every 3 to 4 months.[17] Other technologies in the gel market involve curing of a gel with visible light or with a brushed-on, dropper-applied, or spray catalyst.[14]

Exposure to UV light is a major risk factor for the development of melanoma and nonmelanoma skin cancers.[18] Sunlight and the UV-A light in tanning beds have been shown to damage DNA and to cause mutations that lead to skin cancer.[19] Perhaps of relevance to the described cases, studies performed with mice confirm a relationship between squamous cell carcinoma and artificial tanning,[20] and meta-analytic estimates suggest a significant effect of exposure to indoor tanning appliances for squamous cell cancer but not for basal cell cancer.[15]

In this article, we discuss another common source of artificial UV light, the UV nail lamp, as a possible carcinogen. Although no strong conclusions can be made from this limited case series, we suggest that exposure to UV nail light might also be considered when assessing potential skin cancer risks and that special attention be given to inspecting the dorsum of the fingers and hands and perhaps the feet in the exposed patient population. As we learn more about this increasingly popular technology, this may become another important point for patient education.

Extrapolating from this observation, one might also question the safety of in-home and in-salon UV light use to activate teeth whiteners or the current use of a plastic mouthpiece that is inserted by tanners into their mouths so that the UV tanning lights may activate teeth whitener while they tan. It may be prudent to further explore the potential health hazards of other UV light applications in the beauty industry.

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Correspondence: Deborah F. MacFarlane, MD, MPH, Departments of Dermatology and Plastic Surgery, The University of Texas M. D. Anderson Cancer Center, 1400 Pressler, Unit 1452, Houston, TX 77030 (dmacfarl@mdanderson.org).
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