

### **GEL MANICURES: THE GOOD, THE BAD AND THE UV**

*With proper procedures and UV protection, gels can improve nail appearance*

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#### **OVERVIEW**

The past decade has seen a surge in the popularity of gel manicures, which are valued for their appearance and durability. There are some risks associated with these manicures, however, including skin damage from the ultraviolet light used during the curing process. If a gel manicure is performed properly with UV protection, consumers can enjoy the benefits without experiencing negative effects.

#### **AMERICAN ACADEMY OF DERMATOLOGY EXPERT ADVICE**

Information provided by board-certified dermatologist Chris G. Adigun, MD, FAAD, who specializes in nails at her private practice in Chapel Hill, N.C.

#### **THE BENEFITS OF GEL MANICURES**

Gel manicures have been around for a long time, Dr. Adigun says, but they have become more popular over the last 10 years, thanks to the development of polish formulas that are easier to apply and remove. Today, she says, a gel manicure can be performed in nearly the same amount of time as a traditional manicure — with better results.

When applied properly, gel polish won't chip in a few days like traditional nail polish does, Dr. Adigun says. As a result, she says, a gel manicure provides the longevity and sturdiness of artificial nails without the upkeep or time commitment. "Durability is the No. 1 benefit of a gel manicure," she says. "Plus, no other manicure has the high shine that you get with a gel."

A gel manicure can improve the appearance of anyone's nails, Dr. Adigun says, but the attractive results may be especially beneficial to those whose nails are deformed or discolored because of disease or trauma. Regular nail polish may not adhere properly to a damaged nail or provide enough coverage to mask discoloration, she says, but a gel polish can do both, which makes gel manicures a good option for many patients with nail disorders. "Nails are very visible, so disfigured or discolored nails can be really embarrassing for patients, making it difficult for them to work and socialize," Dr. Adigun says. "For many patients, a gel manicure can be life-changing."

#### **THE RISKS OF GEL MANICURES**

Despite their benefits, gel manicures are not for everyone. According to Dr. Adigun, weak or brittle nails may not be able to withstand a gel manicure, particularly the acetone used during the removal process. Because a UV lamp is required to harden gel polish and bind it to the nail, she says, gel manicures are not appropriate for people who are highly sensitive to UV light; UV sensitivity may be increased by genetic factors, certain medical conditions, and the use of some medications and supplements.

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Dr. Adigun says UV exposure during gel manicures should be a concern for everyone, not just people who know they are especially UV-sensitive, because the lamps used in these manicures emit UVA rays. Although these rays don't burn the skin like UVB rays, she says, they do penetrate the skin to damage DNA and collagen, which can lead to premature aging and may increase skin cancer risk. Some people believe that LED curing lamps provide a safer option, she says, but this is a misconception, as these lamps also emit UVA light.

Although curing lamps are used for just a short period of time during a gel manicure, research indicates that the UV rays emitted by those lamps are four times stronger than the sun's UV rays.<sup>1</sup> Moreover, some customers get gel manicures quite frequently, Dr. Adigun says, and the repeated UV exposure may have a cumulative effect, especially in people who start getting gel manicures at a young age. "The UV dose that you receive during a gel manicure is brief, but it's intense," she says. "Over time, this intense exposure can add up to cause skin damage."

Other risks of a gel manicure include physical damage to the nail or separation of the nail plate from the nail bed, both of which may result from improper curing, Dr. Adigun says. The acetone used to remove gel polish may dry out the nail, she says, but attempting to remove the polish by physical means like scraping or chipping can cause damage, so it's important to ensure that a gel manicure is applied and removed properly.

### **THE PROPER PRECAUTIONS**

In order to get the best results from a gel manicure, Dr. Adigun says, it's essential to use the correct polish with the correct curing lamp for the correct amount of time. Different curing lamps are designed for use with different polish formulas, she says, so those who perform gel manicures at home should stick to the polishes that are appropriate for their curing lamp of choice. Those who utilize at-home gel manicure kits also should be sure to follow all instructions carefully, she says, particularly in regard to curing time.

Dr. Adigun has been in contact with the U.S. Food & Drug Administration regarding the guidelines that govern the safe use of UV curing lamps, which she believes could be improved to better protect consumers. "In an ideal world, every salon would provide customers with a safe solution to protect their hands and fingers from UV radiation during a gel manicure. Until that solution exists, however, customers should be proactive about UV protection," she says. "I recommend that they use fingerless gloves or a similar garment with an Ultraviolet Protection Factor of 50 and wear them for every gel manicure, but customers should be aware that UPF fabric becomes a less effective form of protection with each wash."

Alternative UV protection options include cutting the fingertips off a pair of dark, opaque gloves or applying a broad-spectrum, water-resistant sunscreen with a Sun Protection Factor of 30 or higher at least 15 minute before a gel manicure. Sunscreen may interfere with gel polish application, however, so Dr. Adigun recommends keeping sunscreen off the nails, which provide their own natural UV protection.

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"A gel manicure can give your nails a great, long-lasting look, as long as it is performed properly and you protect your hands from the UV curing light," Dr. Adigun says. "If you're concerned about UV exposure or the health of your nails, talk to a board-certified dermatologist."

### **MORE INFORMATION**

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<sup>1</sup> Curtis J, Tanner P, Judd C, Childs B, Hull C, Leachman S. Acrylic nail curing UV lamps: high-intensity exposure warrants further research of skin cancer risk. J Am Acad Dermatol. 2013 Dec;69(6):1069-70

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### LITERATURE REVIEW AND DR. ADIGUN'S RECOMMENDATIONS

**GEL MANICURES ARE THE MANICURE TECHNIQUE THAT REVOLUTIONIZED THE NAIL COSMETICS INDUSTRY—BUT DO WE NEED TO WORRY ABOUT THOSE LAMPS? HERE ARE THE LATEST FINDINGS SURROUNDING THE QUALITY AND SAFETY OF GEL MANICURE LAMPS.**

Gel manicures have revolutionized the nail cosmetics industry, and have been largely responsible for growing the industry to a value of 8 billion dollars in 2014. Eighty-five percent of nail salons customers request gel manicures. Gel manicures are a relatively quick service and deliver a durable, high-shine, and long-lasting product. The one controversial step in their application is the exposure to a UV-emitting nail lamp to properly cure the product. The question remains as to whether the exposure to the UV radiation during this service is potentially harmful to the customer, and whether customers should take appropriate measures to shield their hands and feet from the potentially damaging effects of the UV radiation during gel manicures and pedicures.

Gel manicures are a gorgeous option for anyone interested in a high-shine, durable manicure. Gels are also great for anyone –young or old— and can be used on people with different types of nail conditions that lead to malformed or dystrophic nails that be socially or occupationally debilitating. Although gel manicures are an excellent option for beautifying the nails, it is important to be aware of the risks that can be

incurred from the exposure of the UVA radiation emitted from the lamps used to cure the gel product. All lamps used to cure gels use UVA radiation to cure the gel product, and each gel formulation is manufactured to cure under a specific intensity of irradiance.

There have been several investigative reports attempting to quantify this risk for gel manicure consumers. Principal challenges in these investigations include the variability in irradiance among nail lamps by the numerous manufacturers, as well as the wide variability in exposure time nail technicians choose for their customers. There is currently no regulation of these lamps, nor the exposure times, and reports have shown wide variability among nail lamps (1). UVA irradiance also varies depending on the placement of the hand in the exposure area—another measure that is not regulated from device to device or salon to salon.

An additional concern is the rise in popularity of LED nail lamps. These lamps have become popular because the curing times required are significantly shorter than the traditional UV nail lamps. The rise in popularity may also be due to the misperception of these lamps as being safer. Although many people mistakenly believe these lamps do not use UVA to cure, these lamps not only use UVA rays, they in fact use higher intensities of UVA wavelengths in order to achieve the shorter curing times. This higher intensity of UVA irradiance means that it requires less time for these lamps to potentially harm the skin.(2) In a sense, calling these lamps “LED” lamps rather than “UV” lamps is actually a misnomer, as these lamps still emit UVA rays.

In 2013, Dowdy and Sayre examined 5 commonly used nail lamps and one rarely used nail lamp (that cures only one fingernail at a time): three lamps with fluorescent bulbs and three with LED diodes. The authors concluded that when the irradiance was measured at the intended use distance of 1 cm from the light source hazard to skin, all 5 of the commonly used nail lamps fell into the highest risk group of lighting systems allowed to be used by the general public in unsupervised conditions: Risk Category 2 of lighting sources according to the Recommended Practice for Photobiological Safety for Lamps-Risk Group Classification and Labeling.(3) It is critical to consider that these

guidelines determine safe levels of exposure based on the general population, and do not take into account individuals who may be more photosensitive by physical characteristics or due to medications or other causes of increased photosensitivity.(4,5)

In 2014, Shipp et al evaluated the UVA and UVB irradiance of UV nail lamps and found great variability between devices. The authors then determined the number of visits needed to reach the threshold for DNA damage, and estimated the number of months it would take to reach this threshold—assuming the patron only went for a gel manicure every 3 months, and the exposure time during the visit did not exceed 8 minutes. The median number of visits required to reach the threshold value for DNA damage was 11.8 visits. If the group had considered that most gel customers go every 3 weeks instead of every 3 months, then the number of months it would require to reach this threshold would actually be met in just 8.9 months.(1) In addition, this is also assuming that the patron was left under the nail lamp for no longer than the recommended 8 minutes—a measure that is not regulated and that both manicurists and gel manicure enthusiasts anecdotally report is an underestimation of the actual time patrons are left under the nail lamps.

In a pivotal study by Curtis et al in 2013, the investigators evaluated UV exposure from two commonly used UV nail lamps. Using appropriate dosimeters that are capable of approximating DNA damage caused by UV irradiation, they were able to conclude that, in less than 10 minutes, a person's hands are exposed to an energy dose that is comparable to the day-long recommended limit for outdoor workers by the International Commission on Non-ionizing Radiation Protection. In this study, the investigators found that the UV nail lamps analyzed emitted over 4 times more energy within than UVA range than normal sunlight.(5,6)

Several studies have compared nail lamp exposure to UVB exposure (which is often used as a therapy for certain dermatological conditions), and even used minimal erythema dose (MED) as a comparable measure.(7) However, MED is a measure primarily of UVB exposure, and does not quantify UVA exposure. Furthermore, UVA rays are more mutagenic than UVB rays due to the increased DNA damage caused by

oxidative stress.(8) UVA rays also penetrate the skin to a deeper depth and are responsible for many of the changes in the skin known as photo-aging: thinning and wrinkling of the skin, visible blood vessels, dyspigmentation, hyperpigmentation and hypopigmentation. And therefore, even from just a pure cosmetic standpoint, these UVA rays emitted from the nail lamps are not to be ignored.

There has been some resistance from the nail cosmetic industry surrounding the claims that these nail lamps may pose health risks, as if the gel manicure product is being threatened by these potential health risks. I disagree. I am a firm supporter of gel manicures, as I believe that they are an excellent product for many nail enthusiasts. I actually recommend gel manicures, from a medical standpoint, to my patients with certain types of nail conditions. What I propose is only that consumers have an easy, thoroughly protective garment that either they bring with them to the nail salon, or that nail salons consider providing for their consumers. This way, everyone wins: gel manicure consumers still receive and enjoy an excellent product while their skin is appropriately protected from the various forms of UV-induced photo-damage.

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