

Nail Salon Safety: From Nail Dystrophy to Acrylate Contact Allergies



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RESIDENT PEARLS

- Every step of the nail manicuring process presents opportunities for nail trauma, infections, and contact dermatitis.
- As residents, it is important to be aware of the hazards associated with nail salons and educate our patients accordingly.
- Nail health is essential to optimizing everyday work for our patients—whether it entails taking care of children, typing, or other hands-on activities.

Nail cosmetics are an integral practice in many patients' lives. However, the manicuring process can result in nail damage via instrumentation, allergens in nail polish, and infections. Many of these nail disorders are preventable through proper education. Therefore, it is critical for physicians to understand the steps involved in regular, gel, and acrylic manicures and educate patients on how to protect their natural nails. Simple preventative measures can be discussed with patients and make a substantial difference in their long-term nail health.

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As residents, it is important to understand the steps of the manicuring process and be able to inform patients on how to maintain optimal nail health while continuing to go to nail salons. Most patients are not aware of the possible allergic, traumatic, and/or infectious complications of manicuring their nails. There are practical steps that can be taken to prevent nail issues, such as avoiding cutting one's cuticles or using allergen-free nail polishes. These simple fixes can make a big difference in long-term nail health in our patients.

Nail Polish Application Process

The nails are first soaked in a warm soapy solution to soften the nail plate and cuticles.¹ Then the nail tips and plates are filed and occasionally are smoothed with a drill. The cuticles are cut with a cuticle cutter. Nail polish—base coat, color enamel, and top coat—is then applied to the nail. Acrylic or sculptured nails and gel and dip manicures are composed of chemical monomers and polymers that harden either at room temperature or through UV or light-emitting diode (LED) exposure. The chemicals in these products can damage nails and cause allergic reactions.

Contact Dermatitis

Approximately 2% of individuals have been found to have allergic or irritant contact dermatitis to nail care products. The top 5 allergens implicated in nail products are (1) 2-hydroxyethyl methacrylate, (2) methyl methacrylate, (3) ethyl acrylate, (4) ethyl-2-cyanoacrylate, and (5) tosylamide.² Methyl methacrylate was banned in 1974 by the US Food and Drug Administration due to reports of severe contact dermatitis, paronychia, and nail dystrophy.³ Due to their potent sensitizing effects, acrylates were named the contact allergen of the year in 2012 by the American Contact Dermatitis Society.³

Acrylates are plastic products formed by polymerization of acrylic or methacrylic acid.⁴ Artificial sculptured nails are created by mixing powdered polymethyl methacrylate polymers and liquid ethyl or isobutyl methacrylate monomers and then applying this mixture to the nail plate.⁵ Gel and powder nails employ a mixture that is similar to acrylic powders, which require UV or LED radiation to polymerize and harden on the nail plate.

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Tosylamide, or tosylamide formaldehyde resin, is another potent allergen that promotes adhesion of the enamel to the nail.⁶ It is important to note that sensitization may develop months to years after using artificial nails.

Clinical features of contact allergy secondary to nail polish can vary. Some patients experience severe periungual dermatitis. Others can present with facial or eyelid dermatitis due to exposure to airborne particles of acrylates or from contact with fingertips bearing acrylic nails.^{6,7} If inhaled, acrylates also can cause wheezing asthma or allergic rhinoconjunctivitis.

Common Onychodystrophies

Damage to the natural nail plate is inevitable with continued wear of sculptured nails. With 2 to 4 months of consecutive wear, the natural nails turn yellow, brittle, and weak.⁵ One study noted that the thickness of an individual's left thumb nail plate thinned from 0.059 cm to 0.03 cm after a gel manicure was removed from the nail.⁸ Nail injuries due to manicuring include keratin granulations, onycholysis, pincer nail deformities, pseudopsoriatic nails, lamellar onychoschizia, transverse leukonychia, and ingrown nails.⁶ One interesting nail dystrophy reported secondary to gel manicures is pterygium inversum unguis or a ventral pterygium that causes an abnormal painful adherence of the hyponychium to the ventral surface of the nail plate. Patients prone to developing pterygium inversum unguis can experience sensitivity, pain, or burning sensations during LED or UVA light exposure.⁹

Infections

In addition to contact allergies and nail dystrophies, each step of the manicuring process, such as cutting cuticles, presents opportunities for infectious agents to enter the nail fold. Acute or chronic paronychia, or inflammation of the nail fold, most commonly is caused by bacterial infections with *Staphylococcus aureus*. Green nail syndrome caused by *Pseudomonas aeruginosa* also is common.¹ Onychomycosis due to *Trichophyton rubrum* is one of the most frequent fungal infections contracted at nail salons.

Mycobacteria such as *Mycobacterium fortuitum* also have been implicated in infections from salons, as they can be found in the jets of pedicure spas, which are not sanitized regularly.¹⁰

Final Thoughts

Nail cosmetics are an integral part of many patients' lives. Being able to educate yourself and your patients on the hazards of nail salons can help them avoid painful infections, contact allergies, and acute to chronic nail deformities. It is important for residents to be aware of the different dermatoses that can arise in men and women who frequent nail salons as the popularity of the nail beauty industry continues to rise.

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