Nail cosmetics and camouflaging techniques

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ABSTRACT: The nail cosmetics industry is enormous, with $6.28 billion spent annually by consumers in the United States on salon services. Nail cosmetics provide the opportunity for women to camouflage unsightly nail conditions and improve the appearance of their nails. Most nail enhancements provide a coating over the nail plate to hide flaws. The coating can be a layer of nail enamel or one of the three main extension systems: acrylic sculptured nails, silk wraps, and ultraviolet (UV) polymerized acrylic gels. The end result is smooth, attractive, blemish-free nails. Adverse reactions to nail cosmetics and salon services are relatively uncommon and involve allergic, irritant, mechanical, and infectious problems. Nail cosmetic techniques are useful for disguising a variety of unsightly nail conditions. There are several conditions that may worsen in the presence of nail cosmetics. Because nail cosmetic use is so widespread, it is important for dermatologists to understand the procedures, materials, and rituals surrounding this industry.

The well-groomed nail is an important accouterment of the modern woman. Americans spent $6.28 billion on nail salon services in the year 1997, the largest percentage of which is spent on artificial nails ($4.15 billion). Pedicures and manicures are next with $0.86 billion and $1.2 billion, respectively (1). Additional money is spent on retail nail cosmetics sold in department stores and salons. There are more than 300,000 licensed manicurists in this country. Pedicures are the most rapidly growing service, probably due to the interest in toenails generated by advertising for the newer oral antifungal medications. Also on the increase are services for teens and men. Nail cosmetics are a huge industry and it behooves dermatologists to be familiar with the materials, techniques, and rituals in this industry.

Cosmetic techniques

Women today have a vast choice of nail enhancement options. These techniques utilize up-to-the-minute chemistry and materials that have been developed for the space industry, automotive industry, and even the use of medical and dental materials. The search is still under way to find the perfect nail enhancement, one that is strong yet flexible, hard but not brittle, and creating a natural-appearing nail without adverse reactions such as allergic, irritant, or mechanical problems. In addition to salon-applied nail enhancements, there are a variety of drug store products that consumers can purchase and apply at home. There are temporary systems that utilize press-on nails in which self-sticking plastic nails are adhered to the natural nail temporarily (Fig. 1). Nail polish, more accurately termed nail enamel or nail lacquer, is another important material that is useful alone or in combination with artificial nail extensions in camouflaging nails that are less than perfect. All nail overlay enhancement procedures cover the natural nail plate with a thin layer of an artificial material that gives the illusion of a smooth unblemished surface and to which nail polish adheres well. These techniques strengthen the nail by adding a splintlike layer of material to the surface of the nail plate that creates a nail that is stronger than the natural nail plate, and more durable and less likely to fracture and split when the traumas of normal daily wear and tear are

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encountered. These procedures provide the benefit of tough and resilient nails, which are especially helpful for women who have thin, fragile nails. These techniques are useful in unsightly nail dystrophies, for which treatment is not totally satisfactory. As with most cosmetics there are some negative side effects that may be encountered and will be discussed. Overall these procedures and products are safe, useful, and very popular when safety guidelines are followed and common sense is used. Women are sometimes uncomfortable asking their dermatologist about nail cosmetics because they are afraid that they will be told not to use them. The dermatologist who is sensitive to the nail needs of his patients and helps her use nail cosmetics safely will be highly regarded.

The consumer has three main salon-applied nail extension systems from which to choose. These three systems are acrylic nails (also called sculptured nails); nail wraps, where a thin sheet of material such as silk, fiberglass, or linen is glued to the natural nail plate or to a plastic tip that has been attached to the natural nail plate; and a more recent type of nail enhancement, ultraviolet (UV) light-activated gel, which uses UV light as the catalyst that activates the acrylate polymerization. In this system the acrylate material is applied to the nail plate, after which the fingertips are placed into a small light box and irradiated for several minutes until the product hardens. Newer variations of gels are available that use water as the catalyst.

**Acrylic nails (sculptured nails)**

This technique employs a liquid monomer and a powder polymer that are mixed together on a brush and applied over the natural nail plate or a plastic tip that has been glued to the nail plate. This material polymerizes in the presence of a catalyst to form a hard plastic coating over the nail that is very durable and resistant to chipping. These acrylic nails are then smoothed, shaped, and polished with nail lacquer (Fig. 2). Some salons are now applying acrylic nails to the toenails as well as fingernails.

**Silk wraps**

This procedure involves gluing a small sheet of fabric made of silk, linen, or fiberglass to the surface of the nail. Additional glue is applied before the surface of the nail is smoothed and polished with nail lacquer.

**Gel nails**

This technique involves an overlay of an acrylate compound that is hardened by exposure to UV light (Fig. 3). This material is a sticky liquid that is brushed onto the natural nail or nail tip and then the fingertips are placed in a hand-sized light box that allows the material to polymerize. These nail enhancements are thinner and less durable than acrylic nails, but provide a smooth surface to which polish adheres.

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**Fig. 1.** Self-adhesive plastic nails provide a simple temporary method of enhancing nail appearance.

**Fig. 2.** Acrylic nail overlays are filed smooth and polished to create an unblemished nail surface.
Fig. 3. An acrylic gel is brushed on the nail and cured by UV-activated polymerization.

Press-on nails

The consumer can purchase plastic nails at the drugstore that are self-adhering and simply pressed onto the nail plate where they adhere until they are removed. This temporary nail cosmetic cover-up is a fast way to conceal flaws of the nail when a quick fix is needed and when durability is not an issue.

Lacquer-based products

There are many lacquer-based products that the consumer can brush on her nails to add color, shine, and smoothness to her natural nail plates. Nail polish (enamel) is applied by the nail technician as the final step in a manicure, over nail extensions, or at home by the consumer. Nail polish comes in an enormous array of colors and materials including sparkles, metallic, fluorescent, and even glow-in-the-dark polish. There is usually a base coat applied first to augment adhesion. One or two coats of nail polish are then added and a top coat that adds hardness and durability to the polish is the final step. There are lacquer-based products that are painted on the nail daily to provide additional coats with the intent of strengthening the nails. Some of these products claim to thicken, harden, or strengthen the nail. There are now nail polishes that contain sunscreen, which protect the acrylics and enamels from yellowing. Another new trend is the addition of antimicrobial agents to nail cosmetics with the intent of preventing and or treating nail infections. The effectiveness of these products remains to be seen.

Problems associated with nail cosmetics

When discussing adverse reactions to nail cosmetics, it may appear that nail cosmetics are hazardous or dangerous. This is simply not true. Nail cosmetics are used safely and satisfactorily by millions of women worldwide. Nail cosmetic reactions are fairly uncommon, easily treatable, and rarely cause serious morbidity. The most common nail cosmetic reactions fall into two or four categories: allergic, irritant, mechanical/traumatic, and infectious. Dermatologists should be aware of the types of nail cosmetic reactions so that the offending products can be discontinued and a suitable substitute suggested. There are treatments and alternatives for most nail cosmetic problems. There are some basic principles that, when followed, make nail cosmetics safer and less troublesome for your patients (Table 1).

Allergic reactions

Allergic reactions to nail cosmetics are relatively uncommon. The major allergens seen in nail cosmetics are toluene sulfonamide formaldehyde resin (TSLF) in nail polish, acrylates such as methyl methacrylate (MMA) in sculptured nails, cyanoacrylate glue, and formaldehyde in nail some hardeners. Allergic reactions to nail cosmetics present with scaling and itching or burning.

Table 1. Tips for safe use of nail cosmetics for consumers

1. Be sure that your salon sterilizes the instruments, preferably with an autoclave. Better yet, purchase your own instruments and bring them with you. Some salons now offer instruments for clients to purchase.
2. If there is any stinging, burning, or itching following a nail salon treatment, you are probably having a reaction to one of the ingredients. Remove the product at once and see your dermatologist.
3. If you use artificial nail extensions, such as acrylic nails, keep them short. Long nails can cause mechanical damage to the nail bed. Remove nail extensions at the first sign of onycholyosis (lifting of the nail) and avoid enhancements until the nail is reattached.
4. Do not allow your nail technician to cut or clip your cuticles. Cuticles serve an important function and should not be cut. They may be pushed back gently with a soft towel after soaking the nails or bathing.
Fig. 4. Allergic contact dermatitis to acrylic nails A) with periungual erythema and scaling, and B) resulting in dermatitis in a periorbital distribution.

of the periungual tissue and sometimes the skin on the face and neck (Fig. 4). The patient often recalls that the product caused stinging or burning shortly after application. MMA has resurfaced in many salons, especially in discount salons. MMA costs far less than the less sensitizing ethyl methacrylate and provides a very hard nail that is resistant to chipping and difficult to remove. Patch testing usually will uncover the allergen (Fig. 5). Often a patient who is allergic to one nail extension system can safely use another system without problems. The dermatologist who is able to discover the offending allergen and suggest alternative products that allow the patient to continue to use nail enhancements will be held in high esteem by the patient.

Irritant reactions

When irritating substances are used in a nail salon or in at-home manicures the potential exists for an irritant reaction of the periungual skin and changes of the nail plate. Irritants can result in paronychia and onycholysis. Some common irritating substances are cuticle remover containing sodium hydroxide and nail polish remover. Nail polish remover containing acetone or acetate is very dehydrating and can cause the equivalent of an irritant reaction in the nail plate, onychoschizia.

Fig. 5. Patch testing will usually uncover the offending ingredients in nail cosmetics.

Fig. 6. Onychoschizia (lamellar peeling of the distal nail plate at the free edge).

Fig. 7. Brittle nails.
Fig. 6. Nail plate granulations caused by the use of nail polish.

(Fig. 6) and brittle nails (Fig. 7). The nails are often soaked in soapy water during a manicure and this practice can exacerbate irritant dermatitis of the periungual skin, especially in people who have a predisposition for hand eczema. Some nail polishes and hardeners can cause or exacerbate paronychia and onycholysis. Prolonged use of nail polish can cause physical changes of the nail plate, such as nail granulations (Fig. 8) and yellow staining of the nail due to the yellow dye in many nail enamels. These reactions are transient, and simple avoidance of the products until the condition has resolved is often all that is necessary.

Mechanical/traumatic

Mechanical and traumatic problems associated with nail extensions are primarily associated with three elements: clipping or removing the cuticle, lack of flexibility of the artificial nail, and the practice of filing or buffing the surface of the nail plate. With the minor traumas of daily wear, the natural nail will bend or break with trauma. An artificial nail is more rigid and the point of stress occurs at the plane of the nail plate and nail bed resulting in microscopic tears of the hyponychium and nail bed and cumulative onycholysis of the nail (Fig. 9). Another area of the nail subject to traumatic incidents is the cuticle. A pivotal part of the manicure ritual involves removal of the cuticle from the nail plate with pusher, scrapers, or clippers. Unfortunately the practice often causes a separation of the nail fold from the nail plate, opening a potential space under the nail fold that is subject to infection and inflammation, causing paronychia (Fig. 10). Cuts or breaks in the nail fold as a result of cuticle cutting can lead to acute bacterial paronychia. Sharp instruments used to clean under the nail too vigorously can cause or exacerbate onycholysis and lead to bacterial infection (Fig. 11). Nail drills are often used to file acrylic nails extensions and can inadvertently injure surrounding skin and drill through the nail.
plate near the cuticle when the artificial nail is prepared for a fill (addition of acrylic material in the proximal portion of the nail plate where growth has exposed new nail) (Fig. 12). Excessive buffing of the nail plate can thin and weaken the nail. Traumatic causes of nail reactions are usually remedied by simply making patients aware of the hazards of certain nail grooming procedures.

Infections

A major cause of infectious nail problems related to use of nail cosmetics is secondary infection of onycholysis and paronychia by yeast and bacteria. These primary nail disorders, which can be related to nail cosmetics use, are secondarily invaded by *Candida* and *Pseudomonas* (Fig. 13). Nail cosmetics are occlusive and prevent the evaporation of moisture from the nail plate, thus promoting subungual microbial growth. Infectious nail conditions associated with nail cosmetic use and salon services can result from contamination of nail instruments in the salon setting (Fig. 14). During home manicures sharp instruments can cut the nail folds and open a portal for infection (Fig. 15). Verruca and dermatophytes can potentially be transmitted from improperly sanitized pedicure instruments, especially files, toe separators, cuticle pushers, and salon footbaths (Fig. 16). A nick or cut of the cuticle or nail fold that draws blood could potentially spread infection if instruments are not properly disinfected. Recent trends are for nail salons to adhere to aseptic techniques, and in some salons autoclaves are used to sterilize instruments used in

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Fig. 12. Electric drills used to file thick acrylic nails can inadvertently injure paronychial tissue.

Fig. 13. Onycholysis with *Pseudomonas*.

Fig. 14. Instruments used in a nail salon for pedicure.

Fig. 15. Acute bacterial paronychia following a home manicure.
manicures and pedicures. The Nail Manufacture Council sanitation guidelines are the standards salons should practice (Table 2). Unfortunately not all of these guidelines are strictly followed. There are some implements that cannot be sterilized, such as nail files and pumice stones used in pedicures. Many salons now offer packets of instruments for sale to their clients. These are used only on a specific client or are taken home and brought to the salon at each visit. The packets usually include a nail file, slippers, orange stick, clippers, and toe separators. The potential exists for the transmission of blood-borne pathogens such as hepatitis and HIV. Fortunately there has never been a documented case of a blood-borne infection contracted from a nail salon service in more than 5 billion services performed (2).

**Beneficial effects of nail cosmetics in disguising unsightly nail conditions**

Nail cosmetics can safely and effectively disguise some nail conditions. In these situations the nail cosmetic hides an unsightly nail and makes it aesthetically more acceptable. For example, women with brachymonychia (raccoon nails) can improve the appearance of their shortened nails with nail extensions (Fig. 17). The extension enhancements lengthen the short nail and help achieve a normal nail length:width ratio of 2.1. Traumatic nail injuries with permanent nail dystrophies and unsightly nail dyschromias are often amenable to nail cosmetic overlay. For many women who cannot control their nail psoriasis or the pitting of alopecia areata of the nails with topical medications and intralesional injections, nail enhancements provide an alternative when all else has failed. Although nail cosmetics can exacerbate nail psoriasis in most cases, the nail psoriasis waxes and wanes independently of the nail cosmetic applications. It is recommended that overlay nail enhancements such as acrylics and silk wraps be removed every

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**Table 2.** Nail Manufacture Council sanitation guidelines for nail technicians

1. Nail technicians and clients should wash their hands prior to providing services.
2. All implements, tools, and surfaces should be sanitized before each client.
3. Follow manufacturer’s instructions, cautions, and warnings for all products and chemicals. Dispose of chemicals properly.
4. Have material data sheets available.
5. Provide ventilation and prohibit smoking in the salon.
6. Obtain 15 hours of continuing education each year. Maintain a state license and follow state board laws.
7. Recommend that clients with questionable nail problems seek medical advice from their dermatologist.
treated with the application of overlay enhancements such as acrylic nails. Some women with onychomycosis of the toenails who do not wish to take an oral medication use nail polish to cover the toenails during the summer when sandals are worn. In my experience, nail polish does not make the onychomycosis worse, nor does it retard the clearing when used during oral antifungal therapy. It is important that patients know that undiagnosed nail conditions should not be hidden by nail cosmetics without prior medical evaluation and approval. Patients who wear nail polish or nail extensions should be reminded that any unexplained growth or pigmentation or irregularity that occurs under or around the nail should be evaluated by her dermatologist and not simply covered up without medical evaluation. Fig. 19 shows an example of a melanoma of the nail hidden by nail polish for more than a decade, leading to a delay in diagnosis.

Two conditions that may worsen with nail enhancements are paronychia and onycholysis of the fingernails and toenails. Nail polish, with its occlusive properties can exacerbate onycholysis and paronychia. Psoriasis sometimes is not worsened by nail cosmetics, however, if there is sensitivity to a product the psoriasis can koebnerize. Most of the problems associated with nail cosmetics in the context of psoriasis are related to excessive length of the nail and trauma. Short nails rarely cause the same mischief.

Aging changes such as longitudinal ridges, thinning, and brittle nails can be disguised and made more tolerable with nail enhancements and overlays. These products are mainly a cover-up and don’t “fix” the nail structure but do alleviate the painful distal splits and cracks that occur.

Fig. 17. The appearance of brachyonychia (short nails) can be improved by the use of nail extensions.

Fig. 18. Habit tic deformity can be improved by the use of nail overlay cosmetics.

Fig. 19. Nail melanoma that was hidden by nail polish and resulted in delay in diagnosis.
These products could potentially exacerbate the problem, but usually are very well tolerated and appreciated by the patient. Except for transient thinning of the nail plate that reverses over 4-6 months when the overlay is removed, the condition is usually not any worse and people are extremely satisfied and relieved that they are given permission to use products that make their nails look and feel better.

**Conclusion**

Nail cosmetics are here to stay. Millions of women use nail cosmetics to enhance the appearance of their nails and hide imperfections. Reactions to nail cosmetics occur infrequently. It behooves the dermatologist to work with patients who wish to camouflage nail flaws and help them do so safely. Just as camouflaging techniques are useful for hiding disfiguring skin conditions, in the proper setting, nail cosmetics can be useful and safe in camouflaging many unattractive nail conditions.

**References**