

# THE DIAGNOSIS OF COSMETIC DERMATITIS\*

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COSMETICS as a whole are among the most harmless substances with which we come in contact. This is proven by the fact that almost all civilized people, female and male, use cosmetics in some form or other, and only an insignificant number ever complain of any deleterious effect of cosmetics on the skin. Nevertheless, the manufacturers of cosmetics are occasionally bothered by complaints from some individuals who claim that a particular cosmetic has caused their skin to become inflamed. Despite the fact that the manufacturer has sold thousands of the same cosmetic and this complaint may be the only one of dermatitis, he should make an effort to determine whether the cosmetic is really the cause of the dermatitis, and if it is, then he should endeavor to find the actual substance in the cosmetic to which the complainant is allergic.

Careful investigation and accurate diagnosis of the causes of reported cases of dermatitis and systemic poisoning from cosmetics is of great importance not only for the benefit of the patient but also to

cosmetic manufacturers and should be encouraged by the latter in order to improve their products and safeguard the public and to protect the good name of cosmetics.

Certain substances, which are classed as cosmetics, are known to be primary skin irritants. That is, they will inflame the normal skin if they are permitted to stay on it for a sufficient period, especially in considerable quantities. Such substances are:

1. Hair tonics containing irritants such as resorcin, cantharides, sulfur, etc., in an alcoholic solution,
2. Hair wavers and straighteners containing strong alkalis, thioglycollic acid, or inorganic sulfides,
3. Depilatories consisting usually of inorganic sulfides or thioglycollates,
4. Hair bleaches containing alkaline persalts,
5. Freckle removers containing inorganic mercurials,
6. Antiperspirants containing aluminum chloride and sulfate,
7. Cuticle softeners containing sodium and potassium hydroxide, or triethanolamine.

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Dermatitis which may be caused by most of the other forms of cosmetics such as creams, hair dyes, lipstick, nail lacquers, perfumes, powders, and cleansers are usually due to allergy of the patient to some chemical in the cosmetic which is innocuous to others, or if it is an irritant it is in such low concentration that it is innocuous to the normal individual.

Skin eruptions from cosmetics are usually acute or subacute inflammations of the skin on the site to which the cosmetic was applied, characterized by erythema, edema, papules, vesicles, and crusts. Chronic changes such as lichenification, induration and hyperpigmentation occur but rarely, because in the majority of the cases where the cosmetic is suspected, its use is discontinued before such changes occur. Only in cases where the cosmetic causing the condition is not suspected, as in dermatitis of the neck and face from nail lacquer, or when the cosmetic is wrongly suspected and there is another cause, do the signs of chronicity develop. In some cases where there is pruritis, scratching may cause excoriations and secondary infections resembling impetigo.

In some rare cases of dermatitis from cosmetics, especially from the hair dyes of the paraphenylenediamine type where there may be absorption into the system, the eruption which begins at the site of application may become generalized.

Pigmentations of the skin have

been recorded from the long continued use of cosmetics. A gray pigmentation from the long continued use of cosmetics containing mercury (*Hydrargyria*), and from long continued use of silver (*Argyria*), due to the deposition of these metals in the skin has been reported. Bergamot oil in perfumes has been reported to cause sharply margined areas of pigmentation on the face and neck (*Berlock dermatitis*). Photosensitivity induced by the oil is supposedly the cause of extra-pigment formation in the affected areas.

The hands, wrists, and forearms may become dry, scaly, and fissured from the continued use of strong soaps, shampoos, and alcohol containing lotions which defat the skin. Beauticians are sometimes affected by this form of occupational dermatitis.

In order to prove the diagnosis of cosmetic dermatitis, the following criteria must be present:

1. The history must show that the dermatitis occurred after the suspected cosmetic was used.
2. That it was not present at any time before.
3. The dermatitis first appeared where the cosmetic was applied, except in cases where the cosmetic was transferred to a more sensitive part, as in the case of nail-lacquer dermatitis.
4. In the large majority of cases, the dermatitis is limited to the

site where the cosmetic was applied.

5. The morphe of the dermatitis is that of a dermatitis venenata; namely, erythema, edema and sometimes papules and vesicles.
6. Patch tests with the cosmetic on normal parts of the skin should be positive. It must be remembered that patch tests are only performed with cosmetics which are not intended to have a primary irritant action on the skin. In cases where patch tests may not simulate the manner in which the cosmetic when used remains on the skin, actual usage tests should be performed. In case photosensitivity is suspected as playing a role in the dermatitis, the site on which the cosmetic was tested should be exposed to the sun for an hour or longer.
7. When the use of the suspected cosmetic is discontinued, the dermatitis should show marked and rapid improvement and re-use of the cosmetic after the eruption disappears should result in a recurrence of the eruption.

#### DERMATITIS FROM CREAMS

Dermatitis from face creams is of rare occurrence. In the last 12 years there are only 5 reported cases in the American medical literature and 1 of these was lead poisoning in an actress from grease paint containing 40 per cent white lead. The

other 4 cases were due to hypersensitivity to petrolatum, triethanolamine, methyl heptin carbonate and a case of slate gray pigmentation of the face from the ammoniated mercury in a freckle cream.

Dermatitis is more likely to occur from freckle creams, bleaching creams, vanishing creams, and cleansing creams than from the so-called nourishing creams. No cases of dermatitis have been reported from hormone creams.

In order to diagnose dermatitis from creams, the suspected cream should be used as a covered patch test on the patient and on a control. The patch can remain on for 24 hours and if no reaction occurs, the site of the patch should be inspected each day for 3 days to observe the appearance of late reactions. If none occur, then the patient should use the cream under supervision on the forearms for 3 or 4 days to observe the effect on the skin. If there still is no effect, then the cream may be dismissed as a cause of dermatitis. If there is a positive patch test on the patient and a negative one on the control, or if the application on the arm causes a dermatitis, then the ingredients of the cream should be ascertained and similar tests should be performed with each in order to find the actual irritant. Cosmetics other than the cream should be suspected if no positive results occur from tests with the cream. If tests with the other cosmetics are also negative, then another source for the dermatitis should be sought.

### ANTI-PERSPIRANTS AND DEODORANTS

Dermatitis in the axilla is not uncommon from the use of anti-perspirants. Solutions containing high concentrations of aluminum chloride have been more at fault than those containing aluminum sulfate. The anti-perspirants swell the epithelium at the mouth of the sweat ducts and thus tend to close the openings and dam back the perspiration. This may result in cyst formation, and sometimes in secondary infection forming pustules. The diagnosis is made from the appearance, site of the lesions, and the history of using an anti-perspirant. Patch tests are unnecessary. Dermatitis has not been reported from deodorants powders. The diseases to be considered in differential diagnosis, are furunculosis, hydradenitis suppuritiva Fox-Fordyce disease and Acanthosis Nigricans.

### HAIR PREPARATIONS

These have caused the majority of cases of dermatitis from cosmetics. The synthetic hair dyes, the chemical hair wavers, straighteners, depilatories, hair lacquers, and hair tonics, have been the worst offenders.

### HAIR DYES

The vegetable hair dyes, henna, sage tea, walnut hull juice, indigo (used with henna to produce brown shades) have caused no trouble.

The metallic salt of lead, silver, copper, cadmium, and tin have not caused dermatitis, but argyria has

been reported from hair dyes containing silver. Lead poisoning has not been reported from salts of lead used for hair dyes.

Since the patenting of paraphenylenediamine in 1883 by Erdman for dyeing hair and feathers, there have been thousands of cases of dermatitis from hair dyes containing it.

Conjunctivitis and keratitis resulting in blindness in a few cases occurred from the use of paraphenylenediamine as an eye lash and eyebrow dye.

So many cases of dermatitis resulted from the use of paraphenylenediamine that in some countries its use on humans is prohibited and in others tests are required to be performed on the subject before it can be applied as a hair dye.

Paraphenylenediamine, paratoluylenediamine, paramidophenol, and aniline black, and other related oxidation dyes are the chief causes of dermatitis and asthma among furriers using them as fur dyes. The predyeing patch test with paraphenylenediamine is useless because sensitization is established at least 5 days after the hair is dyed, therefore unless the patient was sensitized by the hair being dyed with it previously, or the patient was sensitized by wearing fur, dyed with paraphenylenediamine, the patch test will be negative and still the dermatitis may occur 5 days after the hair is dyed. The actual irritant in dermatitis from paraphenylenediamine is one of the

early unstable oxidation products quinone-di-imine. The late oxidation products such as "Bandrowski's Base" are harmless. Therefore, in dyeing the hair with paraphenylenediamine care should be taken to do a thorough job of oxidizing it, and to wash out of the hair all the excess paraphenylenediamine and oxidation products. Dermatitis from paraphenylenediamine is usually localized to the face and scalp, but generalized dermatitis has been reported.

The diagnosis of dermatitis from hair dye is made from the history of having used the hair dye previous to the onset of the dermatitis and by positive patch tests with the dye solutions, either singly or in combination if 2 or more bottle dyes are used.

#### CHEMICAL HAIR WEVERS AND STRAIGHTENERS

Chemicals used for permanent waving and straightening the hair are often reported as causing dermatitis.

The earlier chemicals used for waving depended on their alkalinity to soften the keratin, thus permitting the hair to be stretched and curled and when it dried the curl was retained. The process was reversed when kinky hair was to be straightened. The dermatitis which occurred consisted of alkali burns of the skin.

The alkalis were followed by the so-called "heatless" waving compounds and 1 case of death was attributed to absorption through the

scalp, of hydrogen sulfide liberated from the ammonium sulfide contained in one of them.

At present, the cold waving solutions are being used. They depend for their action on the softening of the hair caused by the reducing agent ammonium thioglycollate which they contain. Dermatitis can occur and has been reported both among the beauticians and those on whom the cold waving solutions were used. The thioglycollates reduce the epithelium of the skin just as they reduce the keratin and cause dermatitis if the cold waving is done carelessly so that the reducing solution stays on the skin for a sufficient time to cause dermatitis. The diagnosis of dermatitis from cold waving solutions is made from the location of the lesions, on the forehead, face, and neck of the person taking the wave and the history of having taken it shortly before the dermatitis appeared. Patch tests are not indicated because the reducing solution is a primary irritant.\* Beauticians giving cold waves get dermatitis on the hands and arms if they do not wear rubber gloves and impervious sleeves. The reported cases of systemic poisoning attributed to taking cold waves have not been substantiated. Diseases of the scalp to be differentiated from the effects of cold waving are Alopecia areata, Folliculitis decalvans, Lupus erythematosus and Syphilitic Alopecia.

\* The loss of hair from the improper use of cold waves is temporary because the hair follicle is not affected.

Dermatitis among negroes from hair straighteners is not uncommon. The sulfides and alkalis used to soften the hair are primary skin irritants as are the hardening solutions among which are formaldehyde.

#### DEPILATORIES

Chemical depilatories have caused dermatitis among their makers and users. The inorganic sulfides of barium, calcium, sodium, and strontium, and the thioglycollates are the principal chemicals used and they are all primary skin irritants. The site of the dermatitis and the history of its appearance shortly after the use of the depilatory determine the etiologic diagnosis. Patch tests are not indicated.

#### HAIR LACQUERS

These are used to keep stray locks in place and are usually solutions of natural resins. During the war when shellac was not available for hair lacquers, a synthetic resin substitute consisting of a combination of rosin with a glycol maleic anhydride resin caused an outbreak of dermatitis on the face. It was a sensitization dermatitis proven by patch tests.

#### HAIR TONICS

These usually contain an anti-septic, a rubefacient, an oil, and perfumed alcohol. Dermatitis occasionally occurs from their use. The forehead, sides of the face, behind the ears, and the eyelids are usually affected. The dermatitis is due to sensitization to one or more

of the ingredients. Resorcinol, betanaphthol, and quinine are the principal sensitizers in hair tonics: Cantharides and capsicum may also be the cause. The diagnosis is established by the history of the dermatitis coming on after use of the tonic by the site of the lesions and by patch tests with the tonic and each of its ingredients in proper dilution.

#### LIPSTICK

When the kiss-proof or indelible lipsticks were first produced, cheilitis was not at all infrequent from their use. We even saw it in men who used lipstick when dressed as clowns. The principal cause was the tetrabromfluorescin which induces a photosensitivity. Other dyes in the lipstick may cause sensitization cheilitis as may the perfume. The history of the onset after the use of a new lipstick, site of the lesions, and patch tests with the lipstick, and each of its ingredients establishes the diagnosis. Areas of the skin patch tested with lipstick should always be exposed to light if, when the patch is removed, the skin shows no reaction.

#### NAIL LACQUERS

These have been and still are a frequent cause of dermatitis. The site of the lesions are usually on the face and neck. Only rarely do they occur on the arms or covered parts of the body. This because the dermatitis is due to touching the skin with the lacquered finger nails. The solvents, chiefly esthers, evapo-

rate quickly and cause no trouble. The chief offending ingredient has been the sulfonamide-formaldehyde resin. The dyes, especially the fluorescent ones have also been offenders. The lesions are usually of the type of lichenified eczema, but acute dermatitis with severe edema especially of the eyelids is occasionally encountered. When chronic eczematoid lesions occur on the face and neck of women who use nail lacquer, the diagnosis of nail-lacquer dermatitis must be considered. The diagnosis is established by uncovered patch tests with the nail lacquer and each of its ingredients.

#### PERFUME

Perfumes are presented in most cosmetics. The fact that in the last 20 years we could only find 18 references to dermatitis from perfumes attests to the rarity of its occurrence.

As perfumes are complex mixtures, it is often impossible to fix the blame on any one chemical compound. Linalool, methyl heptine carbonate, oil of bergamot, oil of lavender, oil of orris, oil of mint, and benzylidene acetone have been reported as actual causes. The oil of bergamot and oil of mint cause photosensitization dermatitis. Methyl heptine carbonate and benzylidene acetate are synthetics.

The diagnosis of allergic dermatitis from perfumes is established by uncovered patch tests. It may require tracing the perfume to its blender to find the actual ingredi-

ents. If this can be done, patch tests may be performed with the ingredients to find the actual irritant.

#### POWDERS

These rarely cause dermatitis. Only 4 cases of dermatitis have been reported from powders in the last 12 years. Two of these were due to the dyes and 2 were caused by the powder conveyors, in 1 instance a rubber powder conveyor and in the other instance a dirty one conveyed a bacterial infection.

Orris root, the allergists bug-aboo, has not been used by reputable cosmetic manufacturers as an ingredient in powder ever since the notorious case in Massachusetts.

When face powder is suspected as the cause of a dermatitis, patch tests should be performed with the powder, and if positive, with each ingredient in the powder. The drying effect of a powder containing an absorptive base such as kaolin, Kieselguhr, etc., must be considered, as a cause of dermatitis if there are no reactions to the patch test.

#### PRESERVATIVES

While no cases of dermatitis have been reported from cosmetic preservatives, the possibility must not be overlooked. When patch tests are positive with a cosmetic and are negative with the ingredients of the cosmetic, the physician should ascertain if it contains a preservative or anti-oxidant and if it does, he should perform patch tests with it, using the same base and dilution as is contained in the cosmetic.

## SUN-TAN PREPARATIONS

Dermatitis has not been reported from sun-tan preparations. This does not mean that it does not occur. It may be attributed to the sun. When a well-known sun-tan preparation properly used does not protect a patient against the burning solar rays, or when a patient using a sun-tan preparation develops a severe case of sunburn which persists for a week or longer, the physician should suspect the preparation. Patch tests should be performed on covered parts of the body, the back

or thighs, and the reaction read before the part is exposed to sunlight.

The diagnosis of dermatitis from cosmetics in the majority of cases, is not difficult to the dermatologist who is familiar with the ingredients used in cosmetics, and in most instances, the actual irritant can be found. But in some cases, not only a thorough knowledge of cosmetics and dermatology, but also the ingenuity and persistence of a Holmes are required, to discover the actual cause of a suspected case of cosmetic dermatitis.