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REPRINT FROM THE
SOUTHERN MEDICAL JOURNAL
Journal of the Southern Medical Association
Birmingham, Alabama
Volume 43 February 1950 Number 2
Pages 165-168
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A COMMON FORM OF FAT DYSCRASIA:
DRY SKIN*

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Dry skin is a commonplace finding in the physical examination of patients today. In 100 consecutive examinations in my office this year, fifty women and fifty men, 64 per cent of the women and 46 per cent of the men gave a history of having suffered from dry skin. In my physical examination of these patients, I noted the presence of dry skin as of clinical importance in 54 per cent of the women and 36 per cent of the men. In examining 100 children under the age of 10 years, all of whom showed dry skin, 31 per cent were girls, 69 per cent were boys. The frequency of this symptom in the past few years has stimulated us to explore the cause and the treatment.

A leading fashion magazine, *Harper's Bazaar*, (1) has recently published an article entitled "Dry Skin-the Great American Drought." I quote their opening sentences:

"It's not seborrhea, acne, impetigo, contact dermatitis, urticaria or dermatophytosis, but plain Dry Skin, that women in every city and village in America complain of today. Our skin is dryer than our grandmothers' ever was. Dryer than our husbands' is. Dryer than the complexions of the women of England, France, Scotland, Italy. Only the peasant women who labor in the fields have dryer skins than our American beauties."

*Read in General Clinical Ses,ioal Medicine, Southern Medical Association, Forty-Third Annual Meeting, Auspices Campbell-Kento County Medical Society of Northern Kentucky, held in Cincinnati, November 14-17, 1949.

These observations parallel those made in my own physical examinations over a period of several years.

When giving a history of their problem, my patients have attributed their skin disorder to one of the following causes: hard water, improperly neutralized soaps, detergents, various household

chemicals, exposure to the sun or wind, dry weather, dust, and incompatible or excessive cosmetics. Physicians realize that these irritants may not disturb some people at any time, while others will suffer from even mild exposure to any of the irritants. Further, they recognize that a dry skin may accompany many diseases in which the patient has suffered febrile states, or has passed through a period of starvation, or has suffered serious liver impairment, or undergone other conditions due to a deficiency of the vitamins.

I shall confine this discussion to dry skin as a symptom of disturbed fat metabolism as it affects the apparently healthy individual.

To prepare for this approach to the problem, let us begin by reviewing the composition of the skin. Stelwagon and Gaskill (2) say that the skin acts not only as a protective covering of the body, but as a closely related organ to the entire body economy. The outermost layer, the epidermis, is constantly expended and is replaced by the lower layers; this horny layer of skin serves to protect the body from blows, from the injurious effects of extremes of temperature and from the absorption of harmful materials. Beneath the epidermis lie the sebaceous and sweat glands, which are excretory glands, with a minor respiratory function; beneath these are the hair, hair follicles and the nails, generally called the appendages of the skin, and the lymphatics, the blood vessels, nerves and muscles, concerned with the function of the nutrition of the skin. The sweat glands remove water from the body under ordinary circumstances at an almost imperceptible rate, cooling by evaporation. Ninety-nine per cent of this excretion is water, the balance being composed of inorganic salts, protein, urea and fatty acids.

Stelwagon and Gaskill indicate that the sebaceous glands provide a natural oily barrier to permeability. Sebum, the material given off by the sebaceous glands, is a semi-fluid fat which normally lubricates the skin, keeping the hairs oiled and the skin pliable. The sebum may become solid when exuded, particularly from such larger glands as those about the nose.

Sebum has not yet been fully analyzed. To date, it is recognized to contain triglycerides (3), cholesterol, oxysterols, saturated and unsaturated fatty acids, 4 phosphates, and choline (5). Hansen and Burr (6) have suggested that linoleic, linolenic and arachidonic acids may be necessary to prevent dry skin in man as well as in experimental animals. This is the outgrowth of the recognition that certain of these multiple bonded fatty acids are now considered to be the essential fatty acids of nutrition (7). In a similar manner, clinical evidence points to the fact that these unsaturated fatty acids may be part of the composition of sebum.

Although the fatty acids of the oils of sebum have been recognized to contain both oleic and palmitic acids, the former of which is a semi-drying oil, the latter, a non-drying oil, the rapid drying effect of sebum suggests the possibility that other multiple bonded fatty acids of much higher iodine number must be present in these materials. Inasmuch as phosphorus and choline have been reported as found in sebum and the skin, it is therefore logical to assume that the phospholipin lecithin, which contains both phosphoric acid and choline, is, in all probability, a constituent lipid of this material.

Lecithin, besides being an excellent source of choline, is an anti-oxidant and would aid in maintaining the sebaceous materials in a fluid state within the gland itself, but would permit rapid dryin- as soon as the material reached the relatively large surface of the skin.

Certain of the problems of dry skin, particularly the follicular keratoses of the dorsum of the arms and buttocks, which consist of keratinized plugs within the sebaceous glands, have been attributed by Frazier and Hu (8) to lack of vitamin A. Adlersberg and Sabotka (9), however, pointed out that lecithin, which contains choline, aids considerably in the assimilation of vitamin A. Morrison (10) has reported that even cholesterol that has been laid down in the arteries can be mobilized by the use of choline. Reduction of cholesterolemia has been reported by Herrmann (11) and Steiner.(12).

The mechanism of fats with reference to the skin appears to be simple. The important cholesterol-like substances that are found in sebaceous material act as a substratum for holding the unsaturated fatty acids in solution, while the lecithin fraction, which contains the phospholipins, prevents the oxidation of the double bonded fatty acids and emulsifies the minute amount of water present. These, when poured over the surface of the skin in small amounts, oxidize and leave a layer of fat over the skin which clings closely, like a good paint.

Dermatologists are in agreement that an unbalanced diet reflects in the condition of the skin. We have previously shown that lecithin aids in certain dermatological conditions (13) (14). Assuming that unsaturated fatty acids and lecithin are essential for the proper nourishment of the skin, let us review the sources of our dietary fats and what we do to them.

The primary source of man's fats today is of vegetable origin, the secondary, meat products, which, in turn, receive their fats from vegetable sources or other animals. Fats, like proteins and carbohydrates, are of many types, but are primarily triglycerides, made up of fatty acids and phospholipins. The fatty acids may be either of the saturated or unsaturated, and the unsaturated fatty acids may be of one or more double bonds. The double bonded fatty acids with 2 - 5 active radicals show the greater biological activity. The phospholipins, of which lecithin and cephalin are important members, are particularly effective as wetting agents, and one of their essential uses in the body is to mix water in oil and oil in water. In the processing of our foods today, we find that the unsaturated fatty acids which are found largely in the germ of our cereals, are removed in the milling, along with lecithins. If these active elements are left within the cereal product, rancidity develops.

In the handling of meat, the prevailing fear of coronary disease causes people to be afraid of eating the fat. The butcher frequently cuts away a large share of the fat on the roast. Those who do consume these meat fats are apt to require it very well cooked. "A-hen foods are cooked at high temperatures, many of the unsaturated fatty acids are oxidized at their double bonds, creating a different chemical, the biological worth of which is undetermined. It is known that when fats are heated to a high temperature the breakdown of glycerin produces acrolein, a known poison. Lecithins, like other lipid substances, are subject to breakdown at normal cooking temperatures. Housewives have been educated to use hydrogenated fats in their cookery further reducing their unsaturation. Maynard (15) points out that hydrogenation of fats causes them to

lose much of their vitamin A potency. Therefore, if all of these elements are eliminated or impaired in the normal food supply, is it not reasonable to assume that unsaturated fatty acid and lecithin deficiency may exert a powerful influence on the body's nutrition?

Recognizing that essential fatty acids have largely disappeared from much of our modern dietary, we have worked out a high protein, high fat, low carbohydrate diet for general rehabilitation purposes.(13) (14). All of the necessary food elements are present in abundance.

The skin is the first organ in which the clinician can judge the effectiveness of a dietary regime. A good skin is soft, pliable, yet tough and resistant to abrasion, heals quickly. The skin that is rough, thick and cuts and abrades easily, is bound down to the subcutaneous tissue and heals slowly, indicating a metabolic disturbance. I have found that rough skin is a fairer index of marginal disturbed fat metabolism than any laboratory means. When important liver, pancreas or other damage cannot be demonstrated, and it is found that the patient is consuming limited amounts of lecithins and unsaturated fatty acids, which result in producing a harsh dry skin, it is a relatively simple matter to reverse the trend of this condition.

The diet I prescribe includes liver and brain, cod liver oil, soy bean lecithin and edible linseed oil, in toto rich in unsaturated fatty acids and lecithins. The conscientious patient usually shows improvement of the skin in one week, and frequently recovers completely within sixty days. In my experience the use of vitamin A concentrates in the treatment of rough dry skin has given little relief. Nicholls (16), Frazier and Hu (17), and Youmans (18) have all expressed the belief that dry skin is a sign of vitamin A deficiency. Youmans reported success in treating patients with cod liver oil, which, it must be remembered, is rich in unsaturated fatty acids of high iodine number.

CONCLUSION

In my experience dry skin is an index of suboptimal utilization of lecithin and unsaturated fatty acids. In the absence of systemic disease the inclusion of foods containing these substances will bring about a spontaneous change in the body metabolism as reflected in the skin.

Surely our patients would thank us if they could liken their skin to that of the peach, as did Ferenc Molnar (19) who placed in the mouth of his hero in "The Play's the Thing" these words:

" - and that skin, how round it is, how smooth it is, how velvety - and how fragrant."

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